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THE IRON AGE

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JUNE 15, 1939

ESTABLISHED 1855

Vol. 143, No. 24

Machines and Unemployment

A SENSE of perspective and knowledge of history are helpful, especially in times like these when many people are mentally traveling along blind alleys.

If you listened to some of these well-intentioned but misinformed people, you would think that poverty, distress, unemployment and relief problems were products of the "machine age." Or that even had such things existed before the "machine age" they have been greatly intensified and enlarged by it.

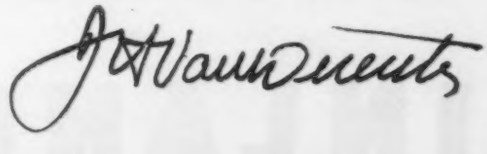
There were no machines in the year 30 A. D. Yet there was poverty, distress and unemployment. So much so that Christ saw fit to single it out and record it for posterity. Said Christ: "For ye have the poor always with you—." (St. Matthew, Chap. 26, V-II.)

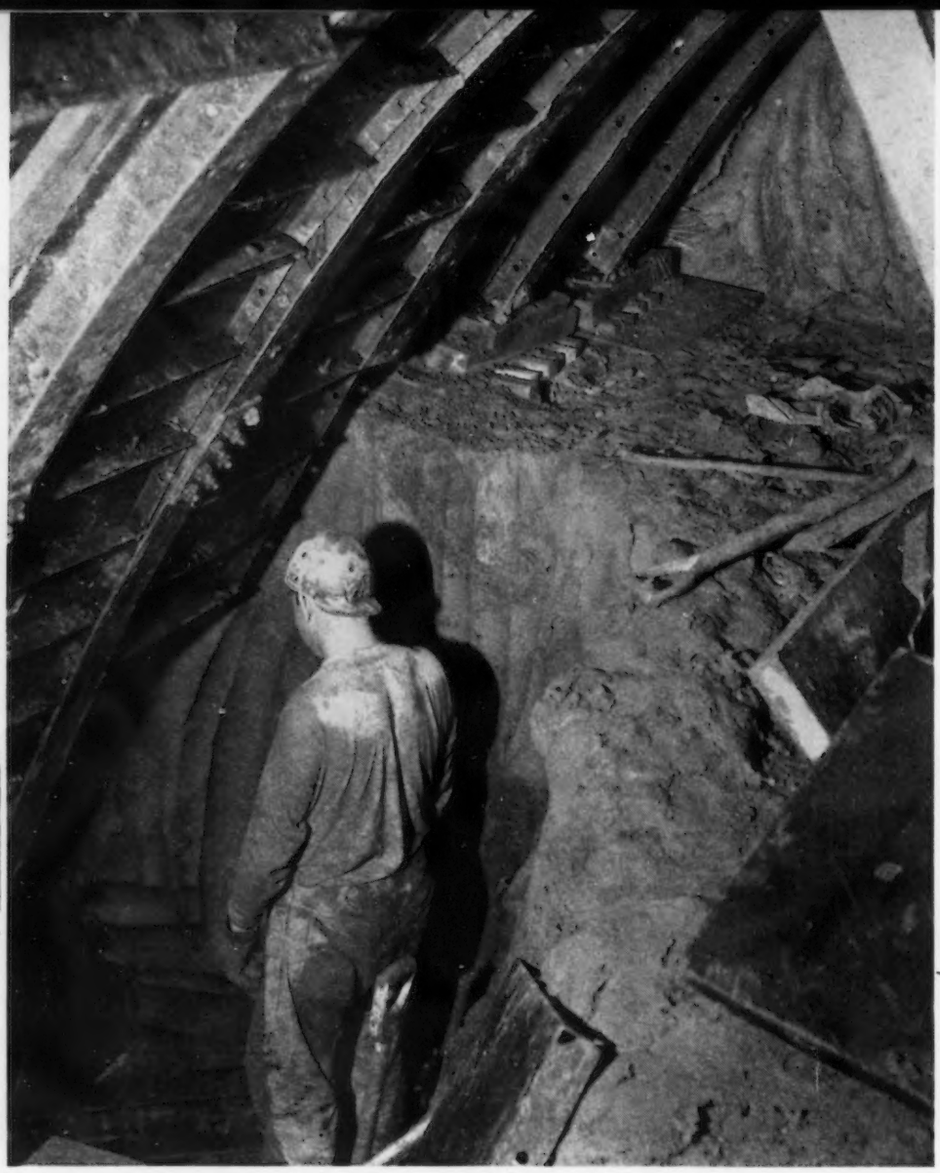
They did not have many "labor displacing" machines in 1615 A. D., 150 years before the invention of the steam engine. But the ***Foundry Trade Journal*** of London calls attention to the following report on the relief problem of Sheffield of that day:

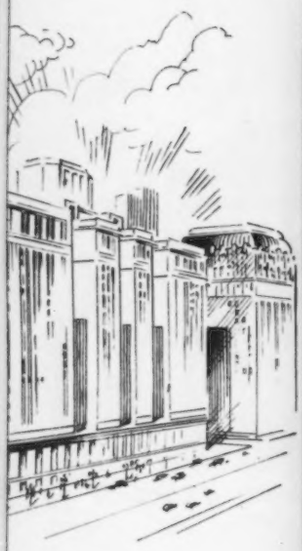
> "By a survaie of the towne of Sheffild, made the second daie of Januarie 1615, by twenty-four of the most sufficient inhabitants there, it appeareth that there are in the towne of Sheffild 2207 people; of which there are 725 which are not able to live without the charity of their neighbours; these are all begging poore. One hundred householders which relieve others. These (though the best sorte) are but poor artificers; among them there is not one that can keep a teame on his own land, and not above tenn that have ground of their own that can keep a cow. One hundred and sixty householders not able to relieve others. These are such (although they beg not) as are not able to abide the storme of one fortnight's sickness, but would be thereby driven to beggary. One thousand two hundred and twenty-two children and servants of the said householders, the greatest part of which are such as live of small wages, and are constrained to work sore to provide them necessaries."

Thirty-three and a third per cent of the Sheffield population of 1615 A. D. were "begging poore" and dependent upon the charity of their neighbors! That is a larger relief load than we faced here in the machine made United States at the bottom of the man-made depression in 1932-33.

We must admit that the machine has had its effect on poverty and distress here in the United States. The machine has created national wealth so abundantly in the past as to enable Uncle Sam to borrow and spend untold billions to relieve the wants and needs of America's distressed on a scale undreamed of and unimagined in the past and unimaginable elsewhere.







Section S-5 showing h
Hi-Steel rib construct
Contractor,
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Chicago.

Chicago's New Subway Takes Shape

with Special Steel Sections Made by INLAND

● Tunneling for Chicago's new subway goes forward rapidly—and here again Inland engineers have co-operated from the early planning stages.

After a thorough study of the problem, special I-Beam arch ribs and liner plates were designed for the job by Inland engineers—permitting quicker setup and a less costly method of sustaining earth pressures prior to the placing of concrete. Plates were designed and tested for pressures of 4,000 lbs. per square foot.

Liner plates and ribs transmit pressure into trusses, held apart by timber cross braces, placed high enough to allow ample working space. Trusses are made of Inland Hi-Steel (high strength low-alloy), to keep weight to a minimum so that they may be erected and moved by hand during tunneling operations.

Inland engineers, working closely with the contractors, have helped them develop a safe and economical method of handling this part of the job. This practical co-operation is typical of Inland and is a good indication of the engineering service you can expect from Inland on any type of construction work involving the use of steel.

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Manufacture of ARTILLERY AMMUNITION

By Lieut. Col.
Levin H. Campbell, Jr.
Ordnance Department
U.S.A.

THIS article deals with the materials and equipment used in the manufacture of artillery shells. A second article will follow at a later date on other phases of ammunition manufacture. The author is officer-in-charge of the artillery ammunition department of Frankford Arsenal, Philadelphia, and this manuscript is released for publication by the Chief of Ordnance, U. S. Army. Statements and opinions are to be understood as individual expressions of the author and not those of the Ordnance Department.

RECOGNIZING the very live interest of commercial industry in the manufacture of artillery ammunition, the editor of THE IRON AGE has requested that the author prepare two articles covering the art as of the present day. The belief is that such articles will be of timely interest and will afford valuable information to commercial concerns who may become engaged in ammunition manufacture.

A complete round of ammunition, as shown in Fig. 1, consists in the main of a steel shell, a fuse, either of the clock type or one or more variations of impact or powder train type fuses, a high explosive shell filler, usually of TNT, a booster to detonate the explosive which is within the shell cavity, a brass cartridge case containing the smokeless powder propelling charge, and a primer in the base of the cartridge case for igniting the propelling charge. The forging is also seen in the picture.

The artillery ammunition department at Frankford Arsenal manufactures the shell, the mechanical time fuse, the brass cartridge case and the primer. In any consideration of artillery ammunition manufacture, it should be constantly borne in mind that in the firing of a projectile, enormous forces are met with. The shell attains a velocity in its travel through the gun, in many cases, of 2800 ft. per sec. and even higher. Such velocity is reached in something less than 0.008 sec. Therefore, if the physical requirements and the exactitude of manufacturing tolerances are questioned, suffice it to say that experience has proved that such requirements are necessary for strength and accuracy.

The Ordnance Department is constantly striving to procure steels of better machineability and uniformity, and is equally striving to increase tolerances wherever actual firings indicate that such may be done with safety and without impairing the accuracy of fire. An inaccurately manufactured shell is invariably an inaccurate shell in flight. The manufacture of ammunition presents probably the greatest mass production which must be undertaken by the Ordnance Department when and if a major war is thrust upon us. It is trite to say what is common knowledge in this connection, and that is the military practice of this country has always been to enter upon the production of implements of warfare after war has been declared—the country's practice to date has not been to carry war reserve stocks in any measurable quantity.

It is also a generally accepted fact that the mass production of munitions must be performed by commercial industry. American arsenals are not, and in the opinion of the writer should not be, equipped for mass production. The true function of the arsenals is to keep alive in time of peace the art of munitions manufacture. To this end, whenever funds have been available, arsenals have been tooled with the latest type of machines offered by the machine tool industry. It is be-

lieved that here the artillery ammunition department is a notable example of one of the country's institutions which is indeed in step with the principles of modern production methods. Within the past 18 months, it has been the practice to set up small lines of production based upon modern progressive methods of manufacture. The tools and other equipment at Frankford Arsenal are the best which the industry has been able to evolve for the particular requirements involved. The production lines are small and have capacities for but a few components of artillery ammunition per day. However, the development of the machines is complete as of the present day. The tools, jigs fixtures, working and inspection gages have been in use for a year and have thus been tried in the crucible of experience. Thus, manufacturers who may become interested in the educational orders to be placed by the Office of the Chief of Ordnance for artillery ammunition, or manufacturers who may be interested in bidding on the ammunition for which funds are to be made available, may come to the arsenal and see the most modern and most economical methods of manufacture. Likewise, should it become necessary, as in time of a war, for industry to go into mass production, these small laboratory production lines may be used as models for augmentation by interested manufacturers.

The machines and equipment which have been purchased are, in many cases, of standard types, tooled to specific needs. In other cases, machines and equipment have been designed for special requirements. The desire has been, in common with other high production industries such as the automotive field, to install high production equipment throughout the laboratory production lines. The Frankford Arsenal has the written assurance of several manufacturers in the machine tool industry that its machines may be produced in time of an emergency in a minimum of time by enlisting the services of the many well equipped machine shops throughout the country. Further, it is the author's belief that the Ordnance Department should assist in allocating a number of these shops to the machine tool industry for their assistance in time of war. Once such an allocation is made, the machine tool manufacturer can make close contact with the machine shops so that the character and quality of work will be mutually understood. Parts so manufactured will be shipped into the parent plant for assembly. By this means, a large number of modern, high production machines will become available for artillery ammunition manufacture in a very minimum of time.

The author also believes that such a procedure is far more rational than

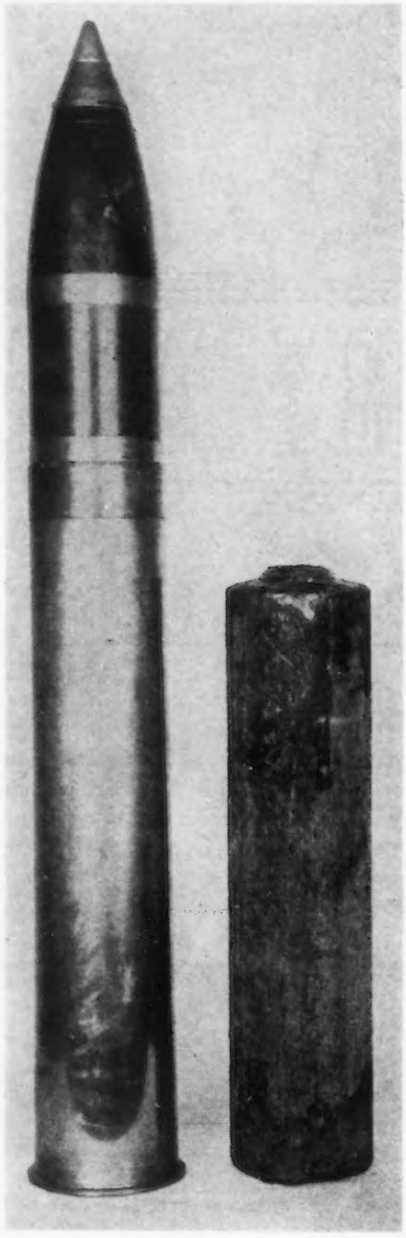


FIG. 1—One complete round of ammunition. Also shown is the raw forging from which a shell of this type is made.

the thought to which some subscribe, that machine tools for ammunition manufacture should consist of simple, single-operation machines, which, by their very simplicity, can be built in machine shops. It is, after all, a question of so many man-hours of machine time, and it would appear better to spend such time in manufacturing high production machines than in the manufacture of machines of most limited production capacity. The expenditure of artillery ammunition in any war yet to come will be without doubt much greater than during the World War. The development of aviation to its present extent can lead to no other belief. Anti-aircraft gun fire will assume large proportions and consume great quantities of shell. It may be recalled that the British forces alone in the battle of the Somme during the World War fired something over 4,000,000 rounds of artillery ammunition, and so, in any consideration of ammunition production, it must be borne in mind that when mass production is spoken of, production and yet more production is what is meant.

Manufacture of Shell Forgings

It should be of interest to follow through the manufacturing cycle required in the production of anti-aircraft shell, for which the demand in time of war will be enormous, and should such a war be within American borders the demand would be very immediate. Remember too, that the demand must be met by production to be reached after the declaration of war.

The first step is to procure the forging. In this country, these are made by two processes, the first of which is known as the conventional method. This provides for piercing a billet in a vertical press and then in the same heat, completing the piercing and forming of the forging to the correct dimensions, by running it through a horizontal draw bench. This bench, in brief, consists of a number of ring dies, or sizing rolls, each of progressively smaller diameter, through which the forging is forced by means of a horizontally acting punch. The metal is thus forced outwardly over the punch. This source of supply is actually the one upon which we must depend for the mass production of forgings.

There are, of course, a great number of hydraulic presses of sufficient capacity in daily use in industry, and the matter of making the draw bench is one which may well be taken care of by the hydraulic press industry within the country. A satisfactory forging is limited to an eccentricity of 0.125 in. Obviously, when the eccentricity exceeds this by any appreciable amount, the rough turning of the shell is correspondingly slowed down and the tool wear and breakage is greatly increased.

The second method of making shell is by the use of an upsetter. Forgings

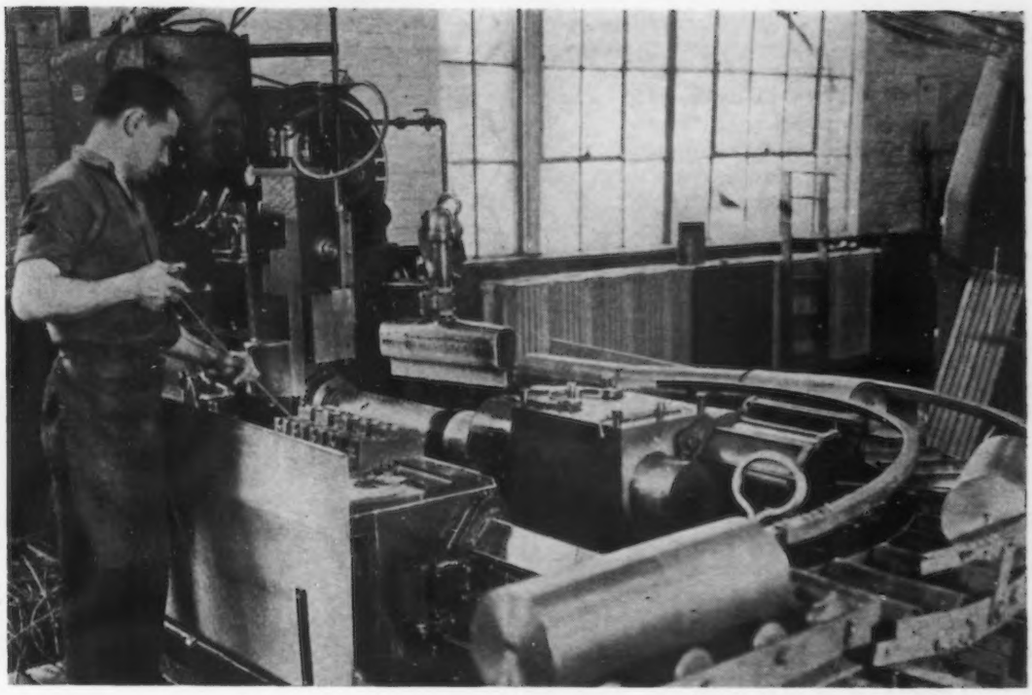


FIG. 2 — Lathe used for rough turning. The shell is centered on an expanding mandrel operating on the interior surface.

made by this process may be held to very close tolerances. Unfortunately, however, there are but few upsetters which will be available for such use in time of war. The average weight of the forging for the shell which is here under consideration is 80 lb. The finished shell is 41 lb. As forging practice improves, of course, this great amount of metal to be removed by machining will be correspondingly reduced. The army is using in its shell forgings at the present time, SAE X-1335, by reason of its high machineability and by reason of the high

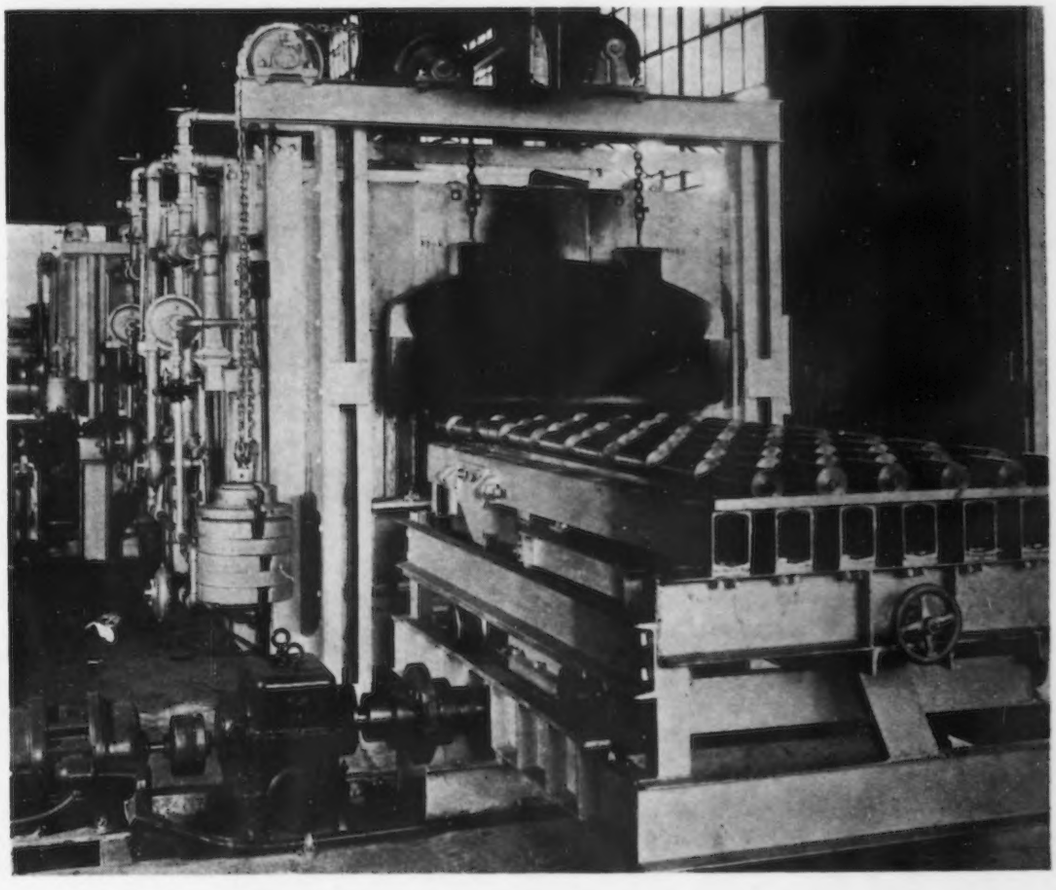


FIG. 3—Loading end of the furnace used to heat the shells prior to quenching.

physical properties inherent in the steel.

Manufacturers of forgings for minor caliber shell recently procured have been successful in reaching, by means of an air quench, physicals as required of 60,000 lb. per sq. in. yield point, with an elongation in 2 in. of 15 per cent. However, the physical properties in the medium caliber shell, which are 78,000 lb. proportional elastic limit, and 20 per cent elongation, cannot be met without heat treatment, which, of course, introduces another operation in the manufacture. Proper heat treatment of a shell presents a real problem in time of war, by reason of the fact that there is little or no commercial demand for the special type of heat treating equipment best suited for the heat treatment of a shell forging. This, in other words, is a type of equipment, the manufacture of which must be undertaken after the declaration of war.

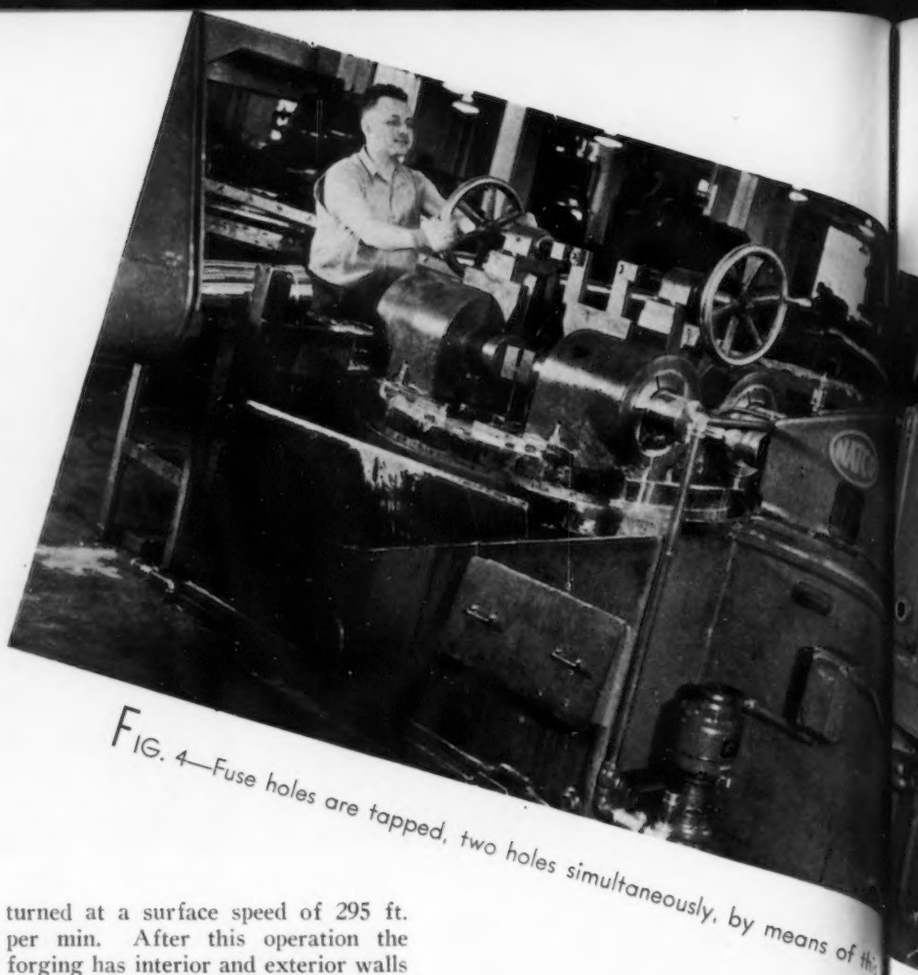


FIG. 4—Fuse holes are tapped, two holes simultaneously, by means of this

Operations in Shell Shop

After receipt of the forging, the first operation is that of cutting off the open end to the approximate depth of shell cavity required. It has been found that the best method of doing this is by means of a standard commercial hack saw, which gives a high production and has the great advantage of ready availability when required. The forgings are then carried by means of a chain conveyor to the centering machine, which is used for putting in the first or rough center in the base of the forging. The shell is here chucked on an expanding mandrel, and a centering drill, which revolves in the opposite direction from the mandrel, forms the center. It has been found necessary, in order that a true center may be had, to introduce these oppositely revolving members.

The shell is now ready for one of the heaviest operations in the entire shell line, that is, the rough and concentricity turn combined. The forgings now used are those known as the finished forged cavity type; that is, the interior of the forging is not machined after receipt by the arsenal. Hence, in rough turning, the center put in by the previous operation is used to chuck the shell on an expanding mandrel operating on the interior surface of the shell. The lathe shown in Fig. 2, and a vertical lathe, on which this operation is performed, carries in the one case five carbide turning tools, and in the other, two tools. Depth of cut is approximately 0.1 in., with a feed of 0.31 in. Forgings of SAE X-1335 steel are being turned at a surface speed of 295 ft. per min. After this operation the forging has interior and exterior walls which are sensibly concentric. It is now necessary to machine the open end to exact length of the required depth of cavity with a face, the plane of which is at right-angles to the axis of the bore of the forging. This operation is done on a facing machine, which has also in the past been used for boring the interior cavity, when such a method was the practice.

From here, the next step is to rough face the base. This is a very severe operation also, as the thickness of the base of the forging varies very considerably in forging practice. For this purpose specially designed base facing machines are used, employing high speed steel tools. These machines are so designed that as the tool approaches the center of the shell, the speed of rotation of the forging is automatically increased through three stages, so that the surface cutting speed is held as nearly constant as practicable. The shell is then passed by means of a roller conveyor to the second centering machine,which is an exact counterpart of that described for the first, or rough center.

Forming Ogive Forward Portion

A chain conveyor now transports the shell to the heat treating and forging shop. Here the first operation consists in heating the nose end of the shell cylinder to an approximate length of 6 in. to a temperature of 2000 deg. F. in an induction heating furnace. It requires 2½ min. to heat the cylinder to this temperature, but with the number of coils now installed a shell is available every 25 sec. The shell is then passed by means of a roller conveyor to an upright position under the ram of the crank press, which carries a water cooled nosing or cupping die. This die is machined to the exact shape of the ogive which must be formed on the open end of the shell. Movement downward of the die reproduces the shape of the ogive which is desired, and the trapped heated air within the shell acts as an ejector. The shell is then carried by means of a roller conveyor to the continuous heat treating furnace.

Heat Treating

The furnace unit, shown in Fig. 3, consists of a hardening furnace, through which the shells are passed, and from which they are permitted to drop by gravity down tubes sealed against the air into the quenching oil. As the shell falls downward, a valve is automatically opened, which causes a heavy stream of oil to be forced through a nozzle about which the shell is centered. Thus, the interior of the cavity receives an equal quench with the exterior surface, which is surrounded by the oil in the quench tank.

A conveyor then takes the shell from the quench upward into the

draw furnace. At the discharge end of this last furnace, the shells are permitted to cool and are then passed through shot blasting equipment, which completely cleans the entire surface, inside and out, of all scale. After this operation, the shells are carried by means of the roller conveyor back to the shell shop to receive their subsequent operations. The first of these is to remove, by means of lathes, the excess metal at the ogive, introduced by the nosing operation, as previously described.

The shell is now carried by a roller conveyor to a six-spindle automatic machine, where all operations on the front end are performed. These consist in facing the mouth, chamfering, boring, reaming, and tapping by means of a collapsible tap. The output in these several operations is very high, and the accuracy of work is uniformly good. A roller conveyor now carries the shell to the machines for the finish turning. This is a very exacting operation in its accuracy, as here the shell must be held to the close tolerances required for an accurate fit within the barrel of the gun, through which the projectile is to be fired. A small amount of excess metal is left on the bourrelets, or bearing surfaces of the shell.

The shell is now placed nose downward in an eight-spindle automatic machine for performing all operations on the rear end, or base of the projectile. These consist in facing the base, putting a small radius at the the perimeter of the base, cutting and dovetailing the band seat, boring, and reaming the fuse hole. For this same operation automatic turret lathes are also used. The production here per machine is again high, and accuracy is maintained. The shell is next stamped with information of its model and type, lot number, etc., by means of a die carried on the ram of a hydraulic press. The fuse hole then is tapped, two shells simultaneously, by means of a tapping machine, as shown in Fig. 4. A specially designed scoring machine now scores, or notches, the band seat, so as to provide a holding surface as against shearing

(CONTINUED ON PAGE 69)

tapping machine.

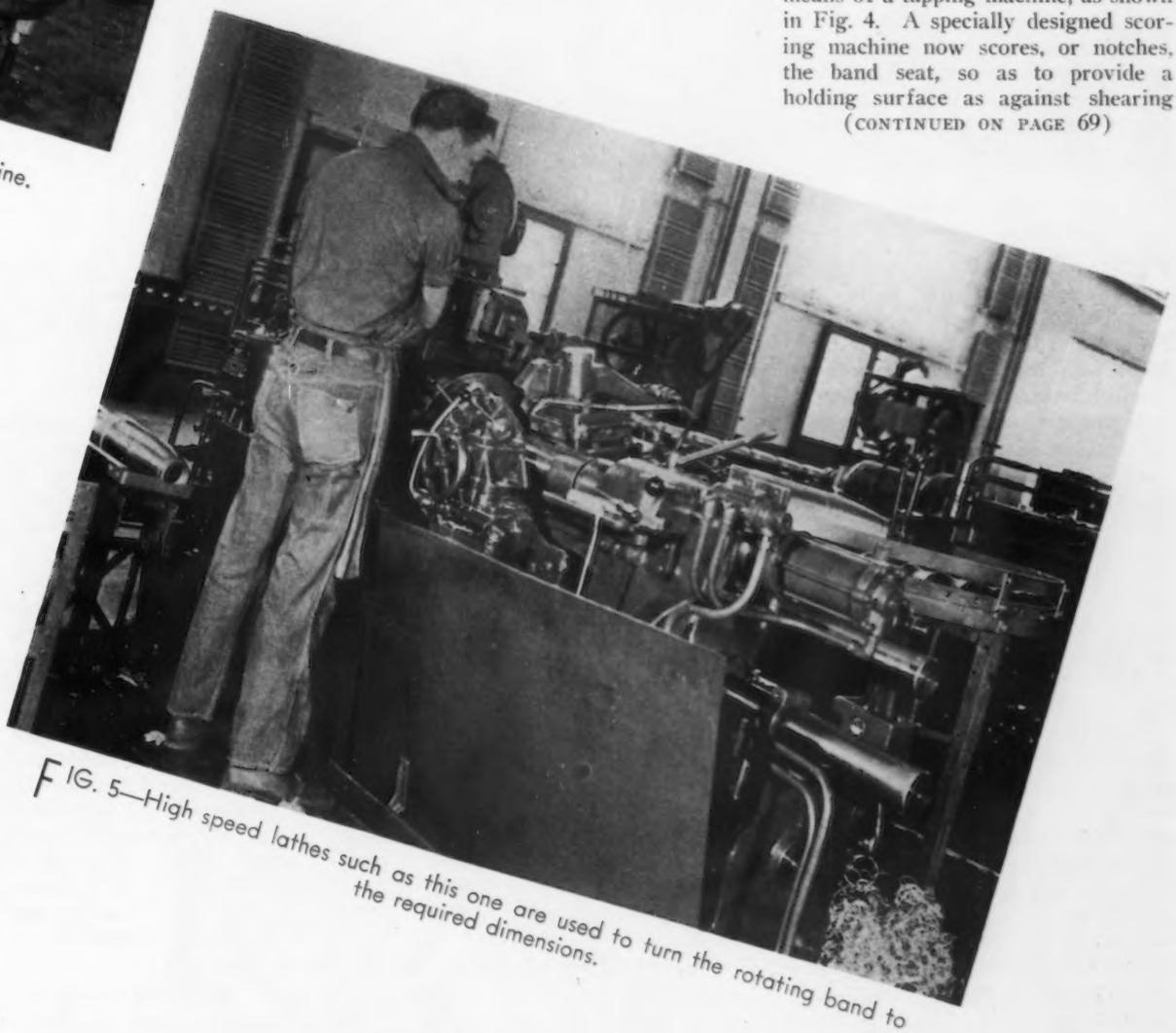


FIG. 5—High speed lathes such as this one are used to turn the rotating band to the required dimensions.

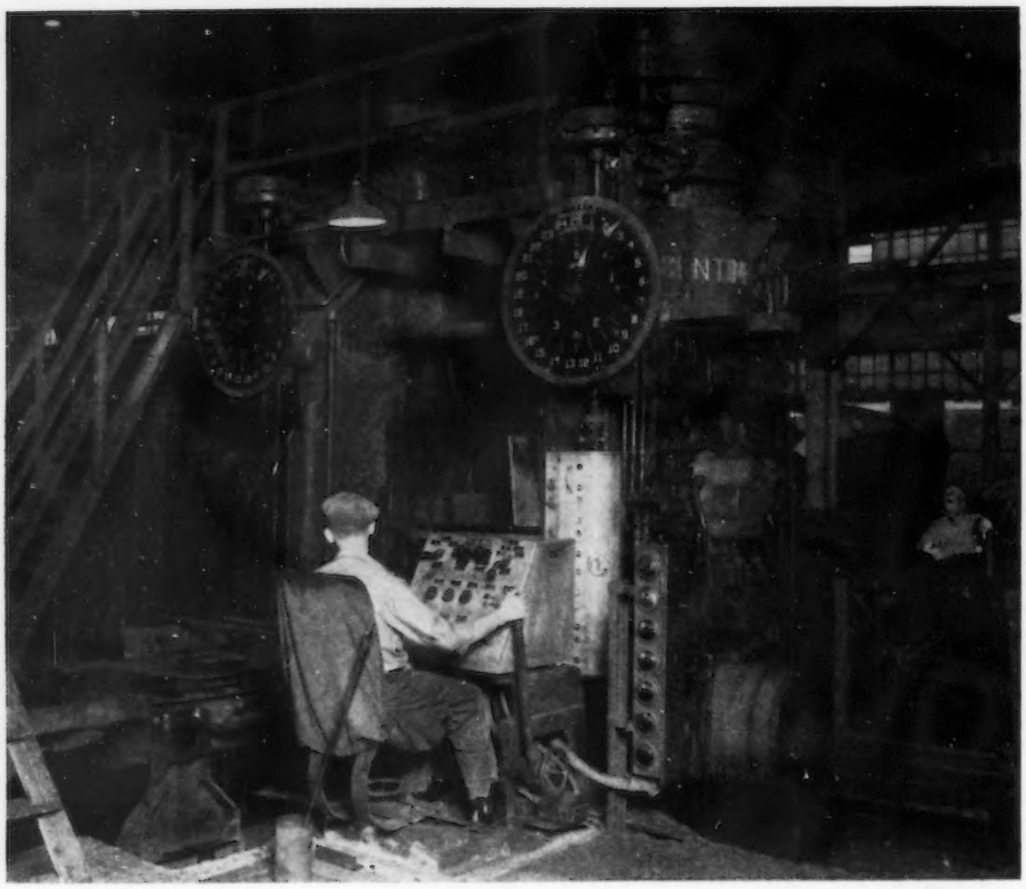


FIG. 1—Three-high balanced mill of the Continental type.

. . . NEW 3-HIGH

TO compete with the modern continuous hot strip mills, steel plants using the conventional 2-high hand sheet mills are constantly faced with the problem of reducing costs of finished sheets and improving rolling methods.

With this situation becoming more acute, Continental Roll & Steel Foundry Co., East Chicago, began the development of a mechanical unit which would be adaptable to the existing mill drive and local plant conditions, and which would produce far greater tonnage with considerably less man power. The initial investment, of course, would be very low as compared with a continuous strip mill installation.

As a result, this type of mechanized sheet mill today is an extremely versatile, high-production, low cost unit—consisting of a 3-high balanced roughing mill and two or three 2-high mechanized finishing mills.

For rolling sheet bar 9/16 in. thick and under, a 3-high jump mill is used for roughing. The new Continental 3-high balanced mill is recommended for rolling sheet bar from 5/8 to 2 in. in thickness. Both mills are designed to produce an average of 1800 pairs of sheet bars each 8-hr. turn, based on operation of five passes per pair, consisting of two single passes and three matching passes. While tonnage figures vary according to the difference in size of sheet bars, the average tonnage of the 3-high balanced mill is about 90 tons for 8 hr., while that of the jump mill is about 60 tons.

Three-high balanced mills usually have top and bottom rolls 32 in. in diameter, and a middle roll of 20-in. diameter. While it is possible to roll wide widths of sheets on a mill of this type, most automatic sheet mill units have been designed for rolling sheets up to 48 in. finished width. Size of sheet bar varies from 8 in. to 16 in. in width, and depending on what is suitable for producing desired width of finished sheet, usually from 26 in. to 52 in.

The 3-high jump mill is the simpler of the two units, and is preferable when rolling sheet bar less than 5/8 in. thick. This type of mill is usually equipped with a hand-operated screwdown, consisting of spanner wheels and wrenches. The bottom roll only is driven, and the middle roll and top rolls are idle, and depend for their rotation on friction between the middle and bottom rolls.

The top and bottom rolls are fitted with fabric bearings supplied with water sprays. The top roll is arranged with suitable wipers to keep the water from coming in contact with the hot material. To provide an ample supply of water for these water bearings, bronze water manifolds are furnished and so arranged that they may be readily removed and replaced with clean manifolds without disturbing the operation of the mill. On the other hand, the middle roll is mounted on roller bearings securely sealed against water and scale, and enclosed in cast steel chocks.

To insure flat rolling of the sheets, the middle roll is provided with lateral adjustment, so that its axis may be placed slightly ahead of the top and

bottom rolls if desired. Large clamps are provided to hold the chocks firmly in position, and to avoid breakage of clamp bolts. These clamps are slideably mounted on machined surfaces, so that they may be readily moved out of position when changing rolls. The complete roll change of the middle roll can be made in less than 5 min.

The mill and tables are supplied with an automatic pressure lubricating system for all lubrication points. All grease and water piping is supplied with the mill up to the point of connection to the main supply.

The motor-driven screwdown is designed with an extremely low inertia factor, provided for quick stopping and starting of the screwdown mechanism to permit speed and accuracy in pass setting. The screwdown is of the worm and worm wheel type, totally inclosed and supplied with force feed oil lubrication to all parts.

The top roll suspension is effected by means of totally inclosed springs mounted over each screwdown mechanism, which are adjusted and locked in position when the mill is erected, eliminating the necessity of constant adjustment, such as is frequently necessary on certain other types of 3-high mills, in addition to eliminating the necessity of any cross member extending through the housing above the roll.

The middle roll is raised and lowered by means of stilliard rods connected through levers to pneumatic cylinders. These cylinders are operated by valves actuated by the motion of the delivery table, so that the middle roll must always be in its proper position with relation to the top and bottom rolls before the table is in position for entry of the bar into the mill.

This arrangement permits extremely fast operation of the middle roll balance mechanism, and insures against roll breakage caused by entry of the bar into the mill before the middle roll is in position to be backed up by either top or bottom rolls, as the case may be.

In rolling sheet bar on a 3-high mill on which the top roll is driven, it is necessary to allow for a variable amount of slippage in the top roll to permit rolling of flat sheets. This slippage was usually obtained by means of a slip coupling mounted in the top spindle and adjusted by means of bolts and springs located at the periphery of the coupling.

In order to obtain the correct amount of slippage, the mill as well as the entire mill train had to be stopped and adjustment made, which, at best, was only an approximation, inasmuch as the correct effect of this adjustment could not be ascertained until the mill was again started up.

A mechanism has been developed which permits the variable slippage of the top roll, which can be adjusted from the outside of the pinion housing while the mill is in actual operation. This mechanism consists of suitable friction disks located in the top or middle pinion, and is totally inclosed in the pinion housing.

The pinion stand is designed with double helical cut tooth pinions, having an unusually large face, and with babbitt bearings of very liberal proportions. The bearings and the pinion teeth are lubricated by centralized pressure lubrication system.

While Continental 3-high mills have been designed for extremely high speed and accuracy of gage, it was also necessary to have feeder and catcher tables of such design that they would be suitable for the rapid reversal, both in transverse motion and vertical motion, and yet be built to eliminate all excess weight.

Both the operator of the feeder table and the operator of the catcher table are conveniently located and seated on spring-cushioned chairs with the electric control box directly in front of them, and with hand levers and foot pedals for raising and lowering of the tables and the various stops directly at their finger tips.

Most of the features in both the mill and mill tables, are covered by patents or patents pending.

BALANCED MILL

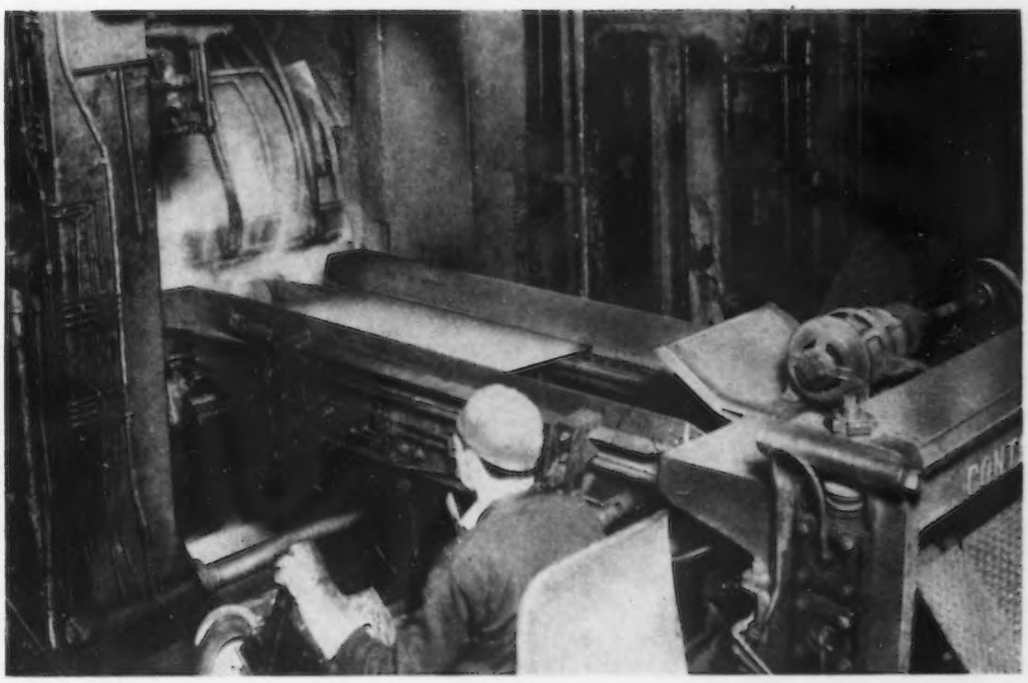
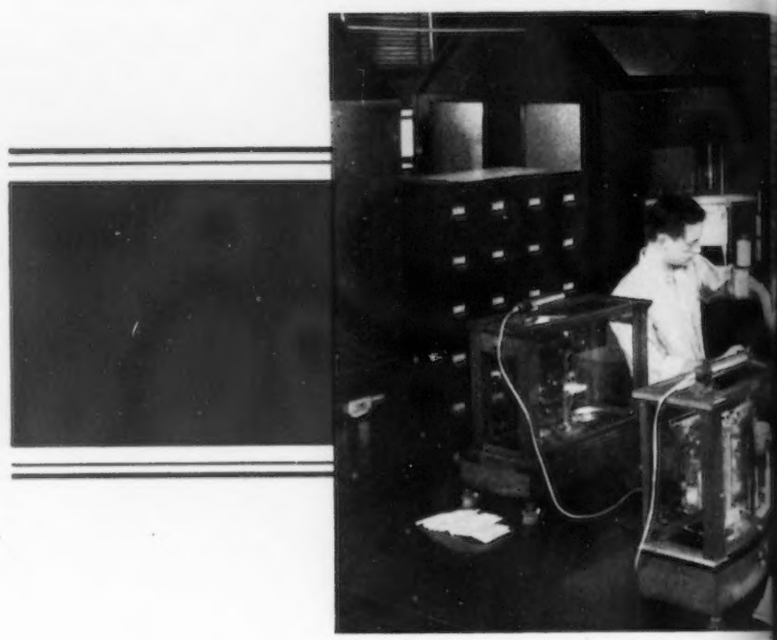


FIG. 2—Automatic table with finger-tip control.

Perchloric

By C. MORRIS JOHNSON
Chief Chemist, Crucible Steel Co. of America, Park Works

A CONTROL laboratory in a mill making ventilated hoods in the background are tions, although they should be regularly



IN three preceding sections of this series of articles the author described the perchloric acid procedure for determining manganese in all types of alloy steels and in iron ore. A perchloric acid test for sulphur in steel, coal and coke also was de-

THE procedure set forth herein shows the determination of nitrogen in chromium metal (98 per cent Cr, 0.10 C) ferrochromium and high chromium-nickel-molybdenum carbide steel by solution in hydrochloric and perchloric acids.

The HCl-$HClO_4$ combination dissolves chromium carbides to a clear red solution in the following chromium-carbon ranges: High-carbon ferrochromium (5 per cent C); and low-carbon chromium (0.08 per cent C) metal. The high-carbon samples should be pulverized and then ground in an agate mortar to the extreme fineness of wheat flour. Pieces of the low-carbon metals are drilled.

The following is a typical time schedule, including the details of solution of both the metal of the alloy and also of the carbides therein:

9:55 a.m. Weigh 1 or 1.5 gm. ferrochromium into a 600 ml. beaker with cover. Add 60 ml. of 1:1 HCl, and place on a hot plate at a digesting, but not boiling, temperature. Heat moderately until the hydrogen action is completed.

10:20 a.m. Remove tests from the hot plate, after reducing the volume of the acid by boiling down to 35 ml. Then add 60 ml. of 60 per cent reagent grade of $HClO_4$.

10:50 a.m. Heat to heavy fuming of the $HClO_4$ until the volume is about 20 ml.

11:40 a.m. Take tests off to cool, and then go out to lunch.

1:15 p.m. Add 200 ml. of H_2O and heat to boiling in order to dissolve all salts by 1:20 p.m., after which boil for 20 min. and cool.

While the samples are dissolving, the distilling apparatus should be cleaned. Then 25 ml. of 60 per cent NaOH and 475 ml. of H_2O and three pieces of mossy zinc are placed in each of the six Kjeldahl flasks, and these are connected to the six tin tubes of the distilling and condensing apparatus. (See THE IRON AGE, July 26, 1934, p. 11.)

9:15 a.m. The burners are lit under the flasks at 9:15 a.m.

9:30 a.m. Contents of the flasks begin to boil.

11:00 a.m. 250 ml. are distilled over into the 500 ml. receiving flasks and rejected. The 250 ml. of solution remaining in the distilling flasks is then cooled to room temperature and retained therein with the pieces of zinc.

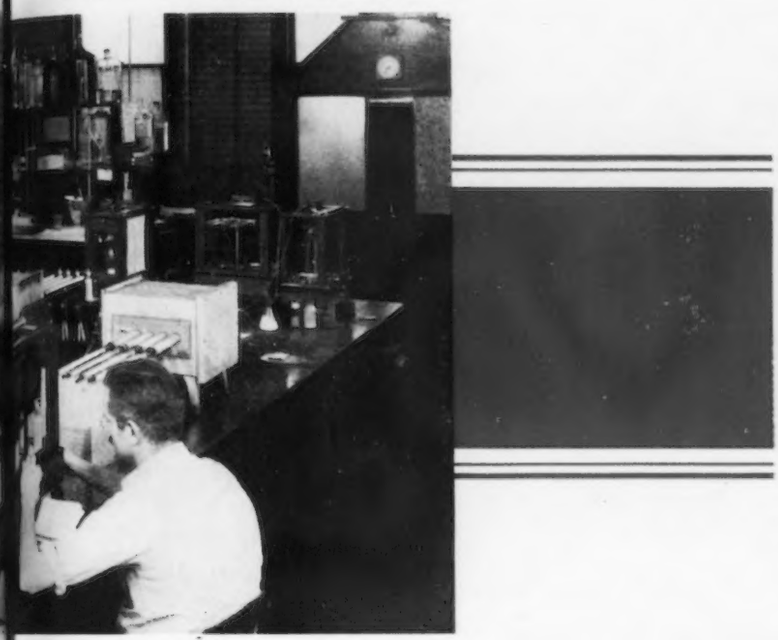
2:20 p.m. 15 ml. of the 0.01 normal H_2SO_4 standard and 35 ml. of H_2O are put in each of the 500 ml. receiving flasks from which the 250 ml. of cleaning distillate has just been removed. The acid solutions of the samples are then transferred from the beakers to these distilling flasks, which contain the remaining 250 ml. of the alkaline liquid from which the 250 ml. had been removed by the distillation just described. This transfer is made in the following manner—pour the total cold solution of the steel and the rinsings of the beakers into the Kjeldahl flasks. The liquid in the flasks will now be acid. Let the acid from the steel solution act on the zinc for three minutes before adding the excess of NaOH. Then neutralize the liquid that is still acting on the zinc with the 60 per cent NaOH. Continue to add the latter until a test with litmus paper indicates a slight excess of the alkali. Now add 10 ml. excess of the NaOH, and no more. During this neutralization the solutions of the samples should not be allowed to become warmer than about 70 deg. F. Connect the flasks with the tin condenser tubes.

2:31 p.m. Flames are lighted under all flasks.

2:45 p.m. The H_2O from the liquid in the flasks begins to boil and is distilled over into the 500 ml. receiving

Acid PART IV

large quantities of highly alloyed steel. The admirable for perchloric acid determina- cleaned to minimize danger of explosions.



veloped. In this, the fourth section of the series, the application of the new perchloric acid procedure for determining nitrogen in steel, ferrochromium, coal and coke is set forth in full detail.

flasks, carrying over the NH_4OH formed from the nitrogen in the steel.

4:00 p.m. Titrate the liquid in the 500 ml. receiving flasks with the 0.01 normal NaOH to reddish brown end point with the alizarine indicator.

The nitrogen results for ferrochromium, using the standard No. 101 (18 and 8) steel as a check are shown in Table I.

(1) The nitrogen in the form of NH_4OH from 10 mgs. of KCNS was distilled into 15 ml. of the 0.01 normal H_2SO_4 + 35 ml. of H_2O. The standard mixture was equivalent to 0.001442 gm. of nitrogen.

(2) Relation between standard solutions was 1 ml. of 0.01 normal NaOH equals 1.11 ml. of H_2SO_4.

(3) After distilling the blank, 13 ml. 0.01 normal NaOH were required to titrate the liquid in the 500 ml. receiving flask to a reddish brown color change with the indicator, or 13 × 1.11 = 14.43 ml. of the 0.01 normal H_2SO_4. Therefore 15 — 14.43 = 0.6 ml. 0.01 normal H_2SO_4, which is the blank to be added to 0.01 normal NaOH deductions.

(4) After distilling over the nitrogen from the 10 mgs. of KCNS, the distillate was titrated with the 0.01 normal NaOH and 3 × 1.11 ml. + 0.6 blank equals 3.9 ml. required to give the end point. There was 15 ml. of the 0.01 normal H_2SO_4 in the receiving flask at the start. Then 15.0 — 3.9 = 11.1 ml. 0.01 normal H_2SO_4 that was neutralized by the NH_4OH coming from the nitrogen in the KCNS etc. The nitrogen in the 10 mg. KCNS plus the 0.04 mg. nitrogen in the 1 gm. of No. 55-A equals a total of 1.482 mg. nitrogen in the standardizing mixture. 1.482 ÷ 11.1 = 0.1335 mg. nitrogen per 1 ml. of the 0.01 normal H_2SO_4.

Factor from 0.200 gm. 0.75 per cent normal ferrochromium: 0.200 gm. of 0.75 per cent nitrogen = 1.50 mgs. nitrogen; 0.5 gm. No. 55-A contains 0.02 mg. N; the total is therefore 1.52 mgs. nitrogen.

It required 2.8 ml. of the 0.01 normal NaOH to neutralize the 0.01 normal H_2SO_4 still left over in the receiving flask from the 15 ml. of 0.01 normal H_2SO_4 placed therein before the distillation. 2.8 × 1.11 = 3.108 + 0.6 blank = 3.7 left over; 15 ml. — 3.7 = 11.3, or 11.3 ml. of the 0.01 normal H_2SO_4 consumed by the NH_4OH coming from the nitrogen in the 0.200 gm. of 0.75 per cent nitrogen ferrochromium + the 0.5 gm. of No. 55-A. 1.52 ÷ 11.3 = 0.1345 mg. nitrogen equivalent per 1 ml. of the 0.01 normal H_2SO_4. The 1 gm. of chromium metal sample was put through all operations, and 11.4 ml. of the 0.01 normal NaOH was required to titrate the 0.01 normal H_2SO_4 left over. This 11.4 ml. multiplied by 1.11, the relation between the 0.01 normal NaOH and the 0.01 normal H_2SO_4 gives 12.6 + 0.6 blank = 13.2 of 0.01 normal H_2SO_4 unused. Therefore 15.0 ml. of 0.01 normal H_2SO_4 ml. put in less 13.2 ml. of free acid leaves 1.8 ml. of 0.01 normal H_2SO_4 consumed by the nitrogen in the chromium metal. 0.1345 × 1.8 = 0.242 mg. nitrogen or 0.000242 gm. of nitrogen. 0.000242 × 100 ÷ 1 = 0.024 per cent nitrogen in the chromium metal.

At the same time No. 101 U. S. Bureau 18-8 steel was analyzed by the same routine and 0.028 per cent nitrogen was obtained by using the nitrogen factor of 0.1345 mg. nitrogen per ml. of 0.01 normal H_2SO_4, which checks the official value.

Highly-Alloyed Cr-Ni-Mo Steels

The determination of nitrogen in the highly alloyed chromium-nickel-molybdenum steels by solution in hydrochloric and perchloric acids is as follows:

Weigh 2.5 or 3 gm. for a test sample, after which the procedure is similar to that of the ferrochromium method just described, except that the preliminary dissolving in HCl takes a longer time. Also $K_2Cr_2O_7$ is added to the standardizing mixture.

In determining nitrogen by solution in HCl and $HClO_4$ as applied to carbide steels, two analysts applied the foregoing to carbide steels and the

following narrates their personal equation.

First Operator: Use 2.5 or 3 gm. for the analysis, and proceed as given for ferrochromium and chromium metal. The preliminary dissolving in 1:1 HCl may require longer time, or about one hour. Then add 60 ml. of 60 per cent C.P. $HClO_4$ and boil down to 20 ml. Then cool and add 200 ml. H_2O. Boil for 20 min., cool and transfer to distillation flasks. Also, $K_2Cr_2O_7$ is added to the standardizing mixtures. For example, in the blank was weighed 1.2 gm. of $K_2Cr_2O_7$, and a blank of 0.6 ml. of the 0.01 normal H_2SO_4 was required for the chemicals.

The one standardizing mixture consisted of 10 mgs. of KCNS and 1.2 gm. of $K_2Cr_2O_7$; the second standardizing mixture consisted of 200 mgs. of an 0.75 per cent nitrogen ferrochromium. A factor of 1 ml. equals 0.152 mg. of nitrogen for the 0.01 normal H_2SO_4 was found from the first, and the second mixture gave a factor of 0.153 mg. nitrogen per ml. of the 0.01 normal H_2SO_4.

Second operator: Weigh 2.5 or 3 gm. of the drillings into 600 ml. beakers. Digest for one hour, with moderate heating, in 60 ml. of 1:1 HCl until the hydrogen action ceases, or nearly so. Add 60 ml. of 60 per cent C.P. $HClO_4$ and boil down to heavy fumes in 30 min. Fume with dense fumes of $HClO_4$ issuing from the beaker for 15 min. more, reaching a final volume of about 30 ml. After cooling add 200 ml. of H_2O and boil for 20 min. Transfer these acid solutions to the distillation flasks in the manner described under ferrochromium, and so finish from that point on.

A standard steel of the same type, from which 0.055 per cent nitrogen was obtained first by the "soluble-insoluble" nitrogen method, was used to get the factor. From another set of drillings, this same steel was also reported later as 0.055 per cent nitrogen by the laboratory of the manufacturer of the ferrochromium. This concern used the vacuum fusion method.

The two variations of the hydrochloric-perchloric method are as described by the two operators, being substantially the same in that a preliminary attack by 1:1 HCl was followed by fuming down with $HClO_4$ until all carbides were dissolved; there was then a solution of salts in H_2O and boiling away of all chlorine odors before the final distillations.

In the first procedure the operator found closely agreeing factors of the order of 1 ml. 0.01 normal H_2SO_4 equals 0.15 mg. of nitrogen. The second operator got a lower factor of 1 ml. of 0.01 normal H_2SO_4 equals 0.13 mg. of nitrogen.

Both analysts obtained good agreement with each other in the same steels, as to the nitrogen content. They concluded also that they were able to check their own results better when there was $HClO_4$ in sufficient excess after the final fuming to cause quite a little action by the $HClO_4$ on the mossy zinc when the acid solutions of the samples were poured into the alkaline liquid remaining in the distillation flasks and containing the pieces of mossy zinc. This action was allowed to continue for three minutes before the final neutralization with NaOH and the addition of the excess of 10 ml. of the 60 per cent NaOH.

The results of this procedure are shown in Table II.

TABLE I

Nitrogen Results for Ferrochromium and 18-8 Stainless Steel

	Per cent Nitrogen, By $HClO_4 + HCl$ Method	Per cent Nitrogen, By H_2SO_4 Method	Per cent Nitrogen, by Vacuum Fusion, by a University Laboratory	Per cent Nitrogen, by $HClO_4 + HCl$ No. 101 18-8 Official 0.028 Nitrogen
No. 1 high-carbon ferrochromium	0.037	0.039	0.033	0.027
No. 2 high-carbon ferrochromium	0.034	0.034	0.026	0.027
No. 7-4 low-carbon ferrochromium	0.059	0.059	0.050	0.029

The above results were gotten repeatedly by $HClO_4$-HCl method.
The No. 101 standard was run in each set to check the entire operation.

TABLE II

Nitrogen Results Obtained by New Perchloric and by Vacuum Methods

Steels That Contain Much Cr-Mo Carbides	Per Cent Nitrogen $HClO_4 + HCl$ Solution Method**	Per Cent Nitrogen Vacuum Fusion Method by Manufacturer's Laboratory
Heat 47-10	0.057	0.055
Heat 47-8	0.064	0.065
Heat 47-22	0.079	0.078
Heat 47-40	0.076	0.077
		By the "Soluble and Insoluble" Nitrogen Method*
Heat 47-32	0.068	0.065
Heat 8-39	0.090	0.089
U. S. Bureau Standard No. 101 (18-8 Steel). Official value, Nitrogen 0.028 per cent; run each time by the same technique as a check	found 0.028	....

*THE IRON AGE, July 26, 1934.
**The HCl-$HClO_4$ method can be used for plain steels also.

A Comparison Method

For the determination of nitrogen in high-carbon and low-carbon ferrochromium and chromium metal by solution in 1:3 sulphuric acid, for comparison with the 1:1 hydrochloric acid-perchloric method, consider the following: If the ferrochromium is low in carbon (about 0.06 to 0.30 per cent carbon), drillings can be taken from the lumps selected throughout the shipment. When the carbon ranges from about 5 to 6 per cent, pieces can be crushed and passed through a 30-mesh screen. An average sample can then be ground to extreme fineness in an agate mortar, as near like wheat flour as possible in particle size.

Digest 1.5 to 2 gm. of the powdered sample, or drillings, in 600 ml. beakers with 150 ml. 1:3 H_2SO_4 until all evidence of hydrogen evolution ceases. Take to heavy fumes of SO_3. After cooling, add 150 ml. H_2O. Heat until all salts are dissolved, then cool again.

Meanwhile the distilling flasks are cleaned. Then, 25 ml. of the 60 per cent NaOH solution and three pieces of mossy zinc and 500 ml. of H_2O are placed in each flask. The six flasks are then set in place on the distilling apparatus (see THE IRON AGE, July 26, 1934, p. 11).

The burners are lit and 250 ml. of the fluid distilled out and rejected. The distilling flasks are then discon-

TABLE III

Comparative Nitrogen Determinations for Various Methods

	Per Cent Nitrogen $HClO_4$-HCl Method	Per Cent Nitrogen H_2SO_4, 1:3 Method	Per Cent Nitrogen, Vacuum Fusion By University Laboratory
5305 (ferrochromium)	0.061	0.058	
7964 (ferrochromium)	0.059	0.058	0.050
Chromium metal	0.024	0.024	
High carbon ferrochromium	0.037	0.039	0.033
High carbon ferrochromium	0.034	0.034	0.026
No. 101 U. S. Bureau 18-8 standard, official value,		0.025	
0.028 per cent Nitrogen, run at same time		0.029	
		0.028	
		0.031	

TABLE IV

	Per Cent Nitrogen, By a Department of the Interior Experiment Station	Per Cent Nitrogen, By Park Plant Laboratory, Solution in $HClO_4 + K_2Cr_2O_7$
11256—Coal	1.64	1.65
13261—Coke	0.99	1.01
15254—Coke	0.98	1.00
16885—Coke	1.16	1.18
16886—Coke	1.40	1.38
18299—Coal	1.49	1.51
18560—Coal	1.15	1.13
21541—Anthracite Coal	0.86	0.89

nected and the remaining liquid in them cooled. The flasks are now ready to receive the dissolved samples. These latter solutions are transferred to the cooled flasks and then mixed with the remaining 250 ml. The mixture is now acid and is allowed to act on the mossy zinc in the flasks for three minutes. Then neutralize the mixture in each distilling flask, keeping it cool all the while as the 60 per cent NaOH solution is added, until the fluid in the flasks is just blue to litmus. Then add an excess of 10 ml. of the 60 per cent NaOH, and no more.

It is important to avoid a large excess of the NaOH, as some of the alkaline solution may be carried over mechanically with the distillate, causing high results. To minimize the chance of error from this cause the stem of the bulb tube connecting the distillation flask with the tin pipe condenser tubes should not be less than 8 mm. bore and about 10.5 mm. O.D. Smaller bore tubes may permit liquid to collect in the bent tube in the trap bulb, which latter should be 2½ in. in diameter and 4½ in. from the top of the flask.

The liquid collecting in the bent tube is, of course, passed into the measured amount of the 0.01 normal H_2SO_4 standard solution in the regular course of the distillation. If the distillate should be more or less alkaline from any excess NaOH in the Kjeldahl flask, carried over mechanically by excessive boiling and steam pressure and too much NaOH to begin with, the nitrogen results will be too high. Such a path of alkali was traced with the indicator at the end of the distillation to flush out the apparatus when the excess of NaOH considerably exceeded 10 ml. just before distillation.

The distillation is then finished as described in the $HClO_4$-HCl solution method given earlier in this article.

In like manner all other steels can be tested for nitrogen if they do not contain insoluble carbides. If such a condition exists then the HCl + $HClO_4$ solution method is the ideal one. The comparative results of this procedure are shown in Table III.

Nitrogen in Coal and Coke

Nitrogen in coal and coke can be determined very efficiently by perchloric + $K_2Cr_2O_7$ solution. The sample is first ground to a very fine powder, as fine as wheat flour, and 100 and 150 mg. weighed into 600 ml. beakers. One gram of $K_2Cr_2O_7$ and 70 ml. of 60 per cent C.P. $HClO_4$ are poured on the coal powder. The mixture is heated on a hot plate fast enough to reach the fuming stage of $HClO_4$ in about 10 min.

At the same time blanks are started. Also 40 to as high as 100 mg. of C.P. dry KCNS crystals are treated exactly with the same chemicals and fumes for the same length of time to get the value of the NaOH standard in milligrams of nitrogen. This salt is a very satisfactory material for this purpose.

The temperature of digestion at fuming of $HClO_4$ is regulated by the individual burners so that the $HClO_4$ is boiling and fuming in the following manner as near as it is possible to describe. Heavy fumes start and begin to escape under the cover glass in about 10 min. Soon yellow drops form on the inside walls of the beakers, and the drop on the lid turns red. After a time, the fumes practically cease to escape, leaving a white fog in the beakers. After further heating this fog clears away. Continue this slow boiling for about 40 min. more with a little $HClO_4$ escaping. The total time at fuming is about 1½ hr.

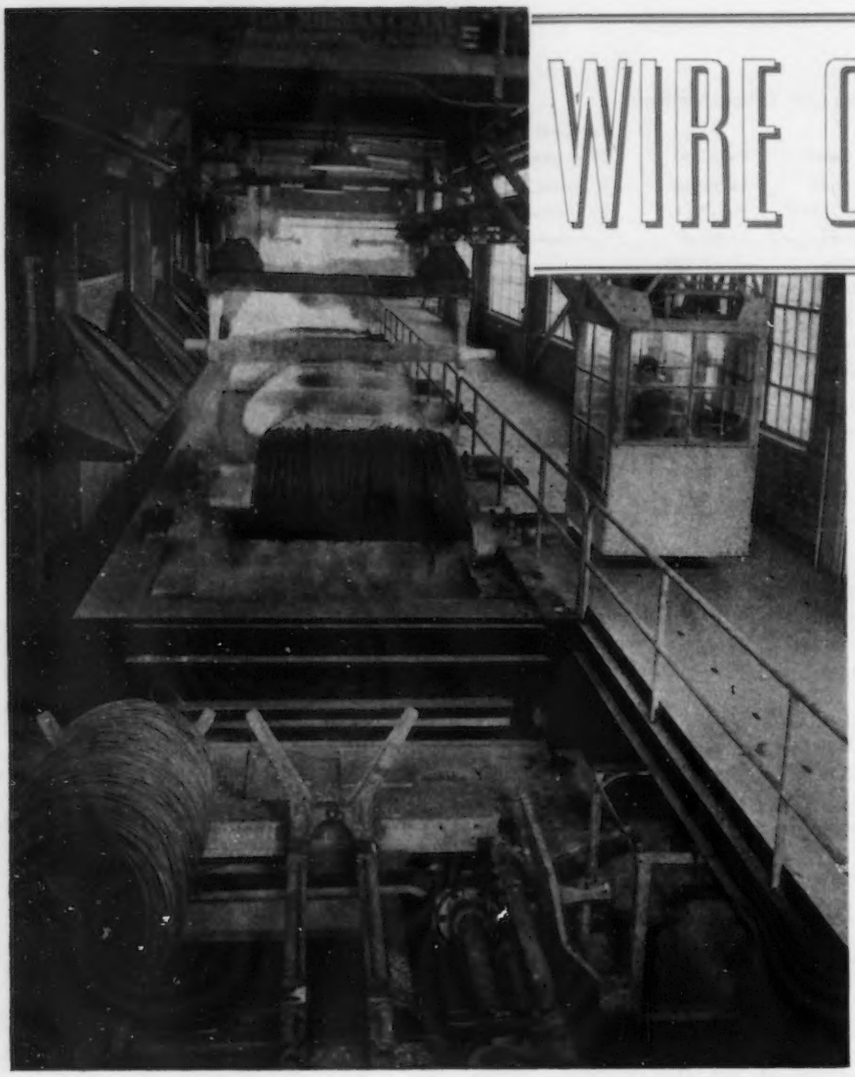
The red crystals are then cooled, 200 ml. of H_2O are added, and the solution is then boiled for 20 min. to get rid of all chloric fumes. The insolubles should be pure white, that is free of any suggestion of black particles.

Meanwhile, or beforehand, in each of the six 800 ml. Kjeldahl flasks pour 30 ml. of a 60 per cent water solution of "nitrogen free" sodium hydroxide flakes. Add 400 ml. of H_2O and a few pieces of mossy zinc, connect with the condensing apparatus, and then distill over into the 500 ml. receiving flasks 250 ml. of the liquid. Reject this distillate and rinse the receiving flasks with distilled H_2O. The distilling of the 250 ml. of the rejected liquid should be proceeding during the solution of the coal or coke, so that the solution remaining in the distilling flasks is cold and ready to receive the dissolved sample. (See THE IRON AGE, July 26, 1934, p. 11, or reprints in Precision Scientific Co.'s bulletin 151-A, Humbolt Park, Chicago.)

Cool the solution of the samples and add the same slowly to the NaOH remaining in the distillation flasks. Avoid generation of too much heat

(CONTINUED ON PAGE 68)

WIRE CLEANING



Lowering a pin with rod bundles into the pickling tank. Note the agitators in the tanks. The chain conveyor is in the foreground.

A NEW cleaning and baking line has recently been completed at Bethlehem Steel Co.'s wire mills at Sparrows Point, Md., to take care of the increased production resulting from the addition of a continuous rod mill and a number of new drawing machines. The new unit consists of two pickling tanks, a wash tank, a high pressure spray tank, three lime tanks, a sulling rack, and three flash bakers, with the necessary crane and conveyor equipment to permit a continuous flow of materials through the unit.

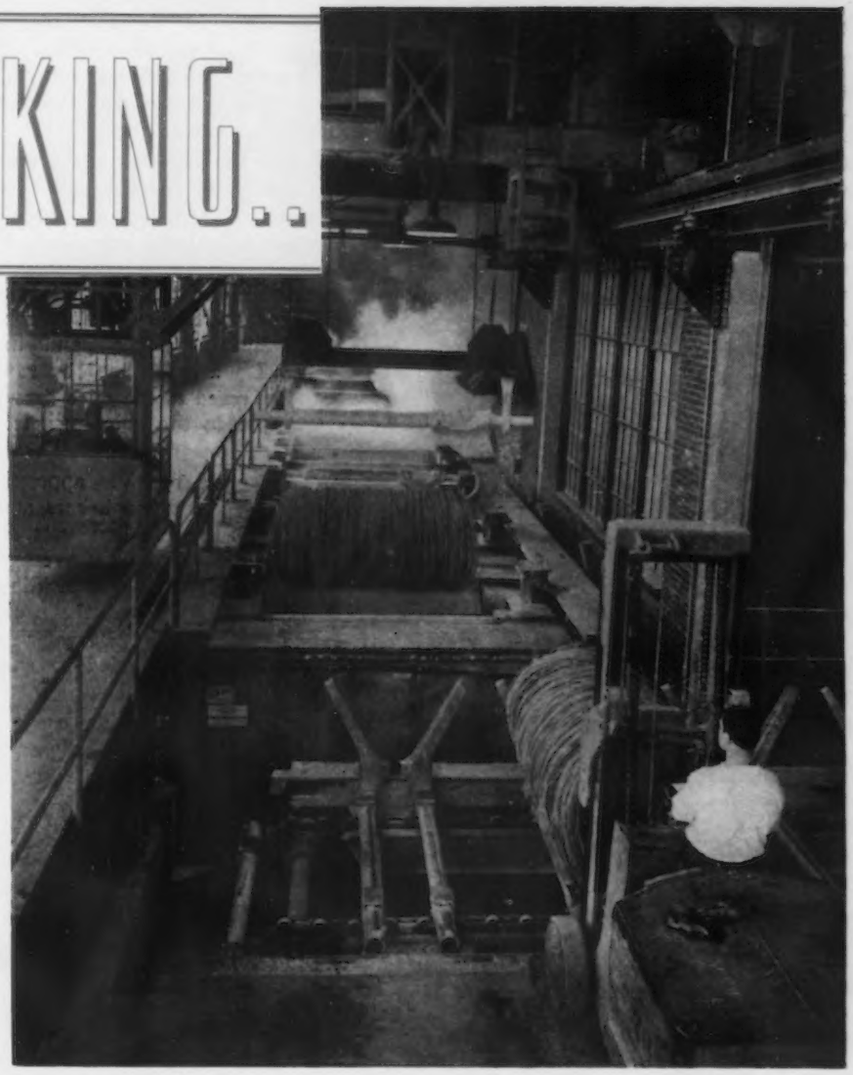
Rod bundles from the two continuous mills or from the storage bins are delivered by overhead tramway to an intermittently operated chain conveyor at the head of the cleaning line, and running at a 90 deg. angle to the line. At the end of the conveyor the loads of rod bundles are picked up, as needed, by a 3-ton revolving trolley crane, equipped with hairpin hooks of acid resistant alloy. The crane has a span of 21 ft. 6 in., a traveling speed of 450 ft. per min., and a hoisting speed of 50 ft. per min. It is capable of turning 90 deg. in each direction, a total of 180 deg., at a speed of 2 r.p.m. A 28-hp. motor operates the bridge, a 15-hp. motor the hoist, and a 5-hp. motor the turntable.

As the crane operator picks up a load of rod bundles from the chain conveyor, another load is deposited at the opposite end, and the conveyor is moved forward one step. The conveyor has push button control and can be operated both from the crane cab and from the tram rail terminal.

The pin with the rod bundles is first deposited in one of two pickling tanks. These are 20 ft. 10 in. long, 8 ft. 6 in. wide, 6 ft. 9 in. deep, and are heated with steam, with automatic temperature control. They are made of steel, painted inside and outside with asphalt composition, and lined with hard burned brick, set in acid proof cement. Both tanks are equipped with two rocker agitators, each with two yokes for supporting the pins with rod bundles, which are suspended crosswise in the tanks. Each agitator is activated by a 10-hp. motor and operates at 15 strokes per minute, giving the rod bundles an up-and-down motion in the pickling bath. Racks placed at the

Wire mill

and BAKING..



End of the line, showing flash bakers and discharge conveyor

bottom of the tanks stop the bundles 4 in. before the end of the stroke is reached. As the coils touch the racks they are raised from the supporting pin. At the same time they spread out at the top, allowing the solution to penetrate completely to every part of the bundle, including the points of contact between rods and pin. Thus the entire surface of the rod is exposed to the action of the acid. The up-and-down movement also increases the pickling action.

As soon as the crane operator has deposited a load of bundles in an empty yoke, he picks up the load of bundles which has been the longest period in the pickling tank and carries it over to the wash tank, which is 10 ft. long, 8 ft. 6 in. wide and 7 ft. deep. It is made of fir, lined with white oak and is divided into two compartments, one for running cold water, for the initial wash, and a spray compartment.

flash bakers.

for water of 100 lb. pressure, applied through three sets of nozzles, one set on each side, and one at the end, for spraying the bundles on the inside.

The thoroughly washed bundles are now moved to a sulling rack made of concrete and steel, 18 ft. long and 8 ft. 6 in. wide, with space for four pins, and equipped with fine water atomizers. Again the crane operator exchanges his load, picks up a bundle that has become completely coated, and carries it to the lime tanks. Three lime tanks are used, for heavy, medium, and light coatings. These are 8 ft. 6 in. wide and have a combined length of 15 ft. 6 in. Steam is injected in all tanks to maintain the proper temperature and to keep the lime in suspension. The tank used for heavy coatings is also agitated by a circulating pump.

From the lime tanks the coils are moved to three specially designed flash bakers. These are heated by indirect firing with a mixture of blast furnace gas and coke oven gas, of 500 B.t.u. Each baker has five sets of U-shaped combustion tubes, placed, one above the other, along the walls. The pin with the rod bundles rests on a cast iron rack placed lengthwise between the legs of the tubes, and separated from them by a partition. At their upper end the legs of the tube are connected with a short piece of pipe

through which part of the gas is recirculated.

A fan draws the air from the baking compartment into the chamber surrounding the combustion tubes and returns it to the baking compartment where it is blown against the ends of the bundles. One set of tubes discharges to one end, the other set to the opposite end. The circulated air is maintained at a temperature of 600 to 700 deg. F.

The baker has hinged covers which are forced downward by the weight of the bundles as they are lowered into the baking compartment. As soon as the bundles are in position on the rack the covers are pulled back into position by counterweights. This prevents the hot air from escaping from the baking compartment, although sufficient opening has been provided between the covers to permit the water vapors to get out.

Baking temperature is controlled automatically, by means of pyrometers, one at the discharge end of each set of tubes. These actuate valves which regulate the amount of gas going to the burners. Air-fuel ratio is set manually, and the proper flow of gas-air mixture of correct ratio is then maintained automatically through potentiometer control.

As soon as the operator has deposited the bundles in one baker, he removes a fully baked load of bundles from another baker and deposits it on a discharge conveyor similar to that used at the head of the line, but running in the opposite direction. From this conveyor the finished and inspected bundles are removed by ram truck and delivered to the wire drawing benches or to the shipping platform.

The entire cycle requires approximately 3 min. With two bakers and seven racks in the pickling vats in constant use, this gives an average baking time of 6 min. and a pickling time of 21 min. However, the cycle depends somewhat on the character of the rod and may be varied to suit any condition.

All operations are under the control of the crane operator. As he passes along the line, the same foot button progressively activates the different pieces of equipment, thus simplifying the manipulations.

Ventilating hoods are provided both over the acid tanks and over the lime tanks. The former are connected to an ejector stack, while the hoods over the lime tanks are connected to a suction fan.

The construction of the basement permits ready inspection of every part, with easy access to all tanks for the repair of leaks.

The following instruments are assembled on a centrally located board:

(a) Six potentiometers, one for each set of five burners on all flash bakers. These automatically regulate the input of the mixed gas and maintain the proper air-fuel ratio, as set by manual control.

(b) One recording gas flow meter for all three bakers.

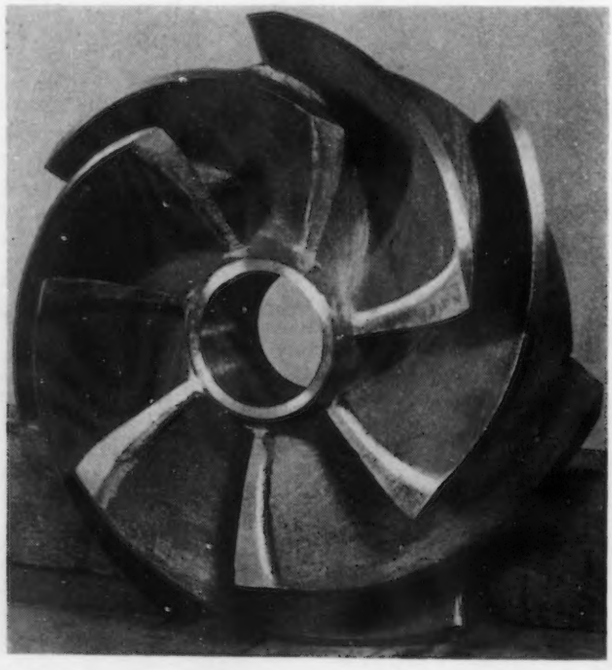
(c) A potentiometer with dual control, for automatic recording and regulation of the acid temperature in the pickling tanks.

(d) A gage for measuring the pressure of the 10-lb. air used in the automatic regulators.

(e) A gage for measuring the gas pressure.

Stainless Steel (18-8) Pump Developed for Pulp Industry

THE Pomona Pump Co., Pomona, Cal., has recently made application of stainless steel for pumps in connection with the pulp and paper industry. Each unit will pump 3000 gal. per min. at a total lift of 48 ft. Waste water from the manufacture of paper is corrosive because of the high temperature of the water, around 180 deg. F., and because of the acid in the water arising from the sulphide process. These conditions are met by the use of 18-8 stainless, with 2 per cent molybdenum in all parts in contact with the water.



A feature of the Pomona pump is an open-bottom impeller working in a conical bow seat. This allows running clearance to be adjusted to exactly the right position at all times and maintains the efficiency of the unit over the complete lift of the pump. Eventual wear can be compensated for in this manner, and varying amounts of water can be pumped by changing an adjustment. The impeller is quite a complicated casting and the company is well satisfied with the result made in casting this part from stainless steel. The quality of this work can be seen in the accompanying photograph of the impeller.

The pump uses a stainless steel shaft held in a rubber bearing lubricated by the liquid being pumped. Neoprene is used in this particular design; it is an artificial material with all the characteristics of rubber and in addition is heat resistant.

ALBERT SAUVEUR

WITH the death on Jan. 26 of Dr. Albert Sauveur, the world lost one of its most distinguished scientists and noblest characters. Long recognized as a great pioneer in the field of physical metallurgy, he was affectionately known throughout the world as the "Dean of American Metallurgists." Endowed with a keen sense of humor, an inexhaustible patience and kindliness, his loss is felt by his friends and colleagues everywhere.

Dr. Sauveur was born in Louvain, Belgium, on June 21, 1863. He came to this country in his early youth after having studied at the School of Mines at Liege. He completed his studies at the Massachusetts Institute of Technology, where he received the degree of Bachelor of Science in Mining and Metallurgy in 1889.

He then entered the employment of the Pennsylvania Steel Co., but left the following year to become associated with the research laboratory of the Illinois Steel Co. at Chicago, and in 1891, was located at the South Chicago plant. He had long been interested in the study of the structure of steel under the microscope and his work at South Chicago resulted in the introduction of important modifications and improvements in the rolling of rail steel.

His first paper on "The Microstructure of Iron and Steel" was presented to the American Institute of Mining Engineers in 1893. In this paper he showed that he had thoroughly grasped the problem of the relative effects of temperature, amount of work, rate of cooling, and chemical composition on the grain size of rolled and forged products. He writes: "It soon became apparent to us that the properties of steel rails were largely dependent upon the dimensions of their microscopical constituents or grain sizes, and that in turn these dimensions resulted chiefly from the finishing temperatures. In this way the importance of controlling these temperatures was brought forcibly to the attention not only of rail makers, but of other manufacturers of rolled or forged products, who until then held the view that hot-worked articles should be finished at the highest possible temperature in order to reduce the power and hence the cost required to shape them. We were able to show that a certain critical temperature existed, which we called X, which yielded the smallest grain size after slow cooling following hot work. We now know that this temperature, X, corresponds to the critical temperature A_{321} or to the critical range $A_3 - A_1$."

He continued his investigations, and in 1896 presented jointly with Dr. Henry Marion Howe a paper on the hardening of steel. At about the same time a paper was presented before the American Institute of Mining Engineers on the "Microstructure of Steel and Current Theories of Hardening." This paper provoked world wide discussion and still remains a landmark in the history of the heat treatment of steel.

Thus began a series of researches in the working of steel and its heat treatment which form the basis of our present knowledge of metallurgy. These researches were, however, simply a beginning. Throughout his long and useful life, Dr. Sauveur gave all his time and effort seeking further knowledge and by his enthusiasm and clear thinking helped and inspired others to learn also.

Dr. Sauveur was a tireless worker and a prolific writer, and hardly a branch of metallurgy exists upon which he did not give the world useful and important knowledge. He was best known, perhaps, for his theories and researches on the hardening of steel, but his explanation and description of the malleablizing process and his researches on critically strained ferrite and its recrystallization in annealing still remain as important contributions.

Dr. Sauveur's greatest and most widely known work was his textbook "The Metallography and Heat Treatment of Iron and Steel." It is doubtful if there is a metallurgist in the world who has not this masterpiece in first place upon his bookshelves.

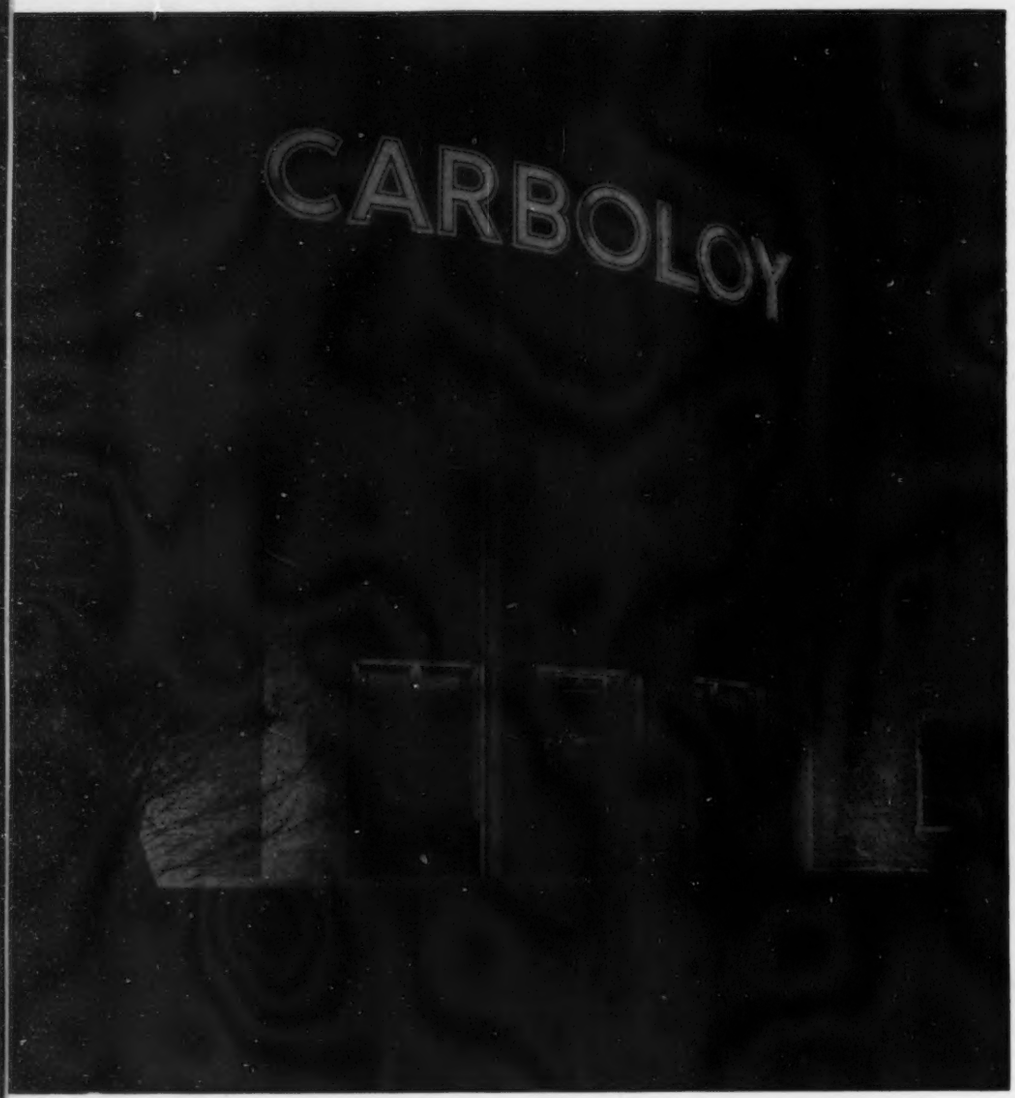
In 1899 he was invited to join the teaching staff of Harvard University and in 1905 he was appointed Professor of Metallurgy, a position which he held until his retirement a few years before his death. During the World War he was metallurgist of the American Aviation Commission in France and Director of Research for the Metallurgical Division, Air Service A. E. F. Shortly after the war he was United States delegate to the Pan-American Scientific Congress held in Lima, Peru.

Dr. Sauveur received a D.Sc. from Case School of Applied Science in 1921; from the University of Grenable, France, in 1924; from the University of San Mareo, Peru; and from Harvard University in 1935. He received the Degree of Doctor of Engineering from Lehigh University in 1926. He was the recipient of the Bessemer Medal of the British Iron and Steel Institute in 1924, and was the first to receive the Albert Sauveur Achievement Medal from the American Society for Metals in 1934. He was awarded the Elliot Cresson Gold Medal of the Franklin Institute in 1913 and was awarded posthumously the Franklin Medal in 1939.

Dr. Sauveur was an Honorary Member of the American Institute of Mining and Metallurgical Engineers, an officer of the Order of Leopold, Belgium, a member of the National Academy of Sciences and an officer of the Legion d'Honneur. He was a fellow of the American Academy of Arts and Sciences and of the American Philosophical Society.

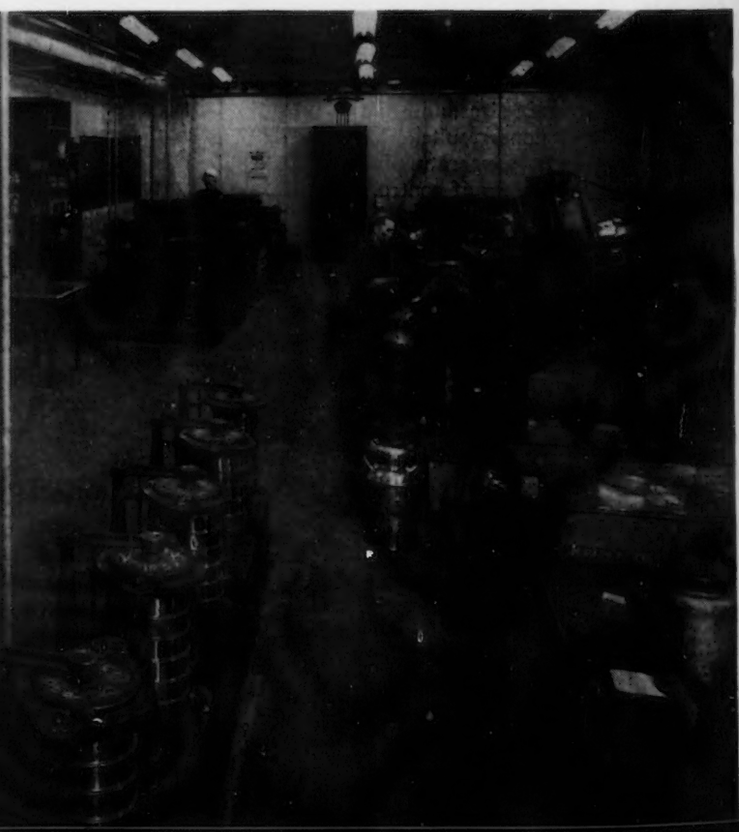
His students, friends and associates knew him as a man of great patience and wisdom. By suggestion rather than by command he made his wishes known and his opinions clear, and many were the students who were helped and encouraged by his kindliness and appreciation of their meager efforts. His charming and gracious personality, his clear thinking and enthusiasm endeared him to all. His life, his character and his work will remain to those who knew him as a precious memory of an active, useful life, a kindly, manly, steadfast spirit.

JOSEPH WINLOCK,
Chief Metallurgist,
Edward G. Budd Mfg. Co.



CONSOLIDATING all manufacturing facilities formerly located in Cleveland, Detroit and Stamford, Conn., Carboloy Co., Inc., has just opened a new Detroit plant which is said to have the largest cemented carbide manufacturing facilities in the United States.

The powdered material room (lower left) is completely air conditioned to maintain a constant level of temperature and humidity, which permits accurate weighing and blending of materials which are hygroscopic in nature. In the press room (upper right) two 300-ton presses, with a capacity of several million grams of Carboloy monthly, provide for the production of ingots pressed from the powder, up to 20 in. in area. Two supplementary continuous



presses, with a capacity of several hundred pieces per hour, press individual pieces requiring no additional forming operations.

In the forming department (center), milling machines, grinders, lathes, cut-off equipment, etc., are used to form the rough semi-sintered ingots and special blanks into the shapes desired. An average stock of 250,000 grams of Carboloy cemented carbide is maintained in this department in the form of semi-sintered ingots and cylindrical blanks for immediate forming.

In the sintering room (lower right) a "boat" of pressed Carboloy rings is shown being introduced into the electric furnace for the semi-sintering process. Eighteen furnaces are installed in this department for reduction, carburizing, semi-sintering and sintering process. Many of the furnaces have such features as stoking units, controlled heating and cooling cycles, etc. Individual meters control hydrogen for each furnace.

In addition to the departments shown here, there is a grinding department where batteries of hydraulic surface grinders, universal internal and external grinders, special cutter grinders, diamond lapping machines, etc., receive the Carboloy tools as they come from the brazing department and perform the final grinding operations.

The milling department contains equipment such as milling machines, lathes, backing off lathes, screw machines, shapers, etc., to prepare tools and cutters to accommodate the Carboloy insert prior to the brazing operations. And in the drawing and sizing die department, bar and tubing dies are segregated from the production of tools, and operations include preparation of casing to receive the Carboloy nib, rough drilling, lapping and finishing of round hole dies.

The metal casing is hot forged around the Carboloy die nib. Two percussion presses, 250 ton and 50 ton, are installed at present for this purpose. The process provides complete support for the nib on all surfaces except at the hole through which the wire, bar and tubing pass.

HIGH SPEED HYDRAULIC TYPES

WITH the recent development of high speed, streamlined machines, much wider application is being found for hydraulic presses. The announcement of a triple action type marks a further advance into the field heretofore covered by mechanical types. A hydraulic stretching machine offers a new method of forming sheets over simple dies, and a sheet metal shrinker has been designed with a reverse action to that obtained with a hand or power hammer. Photo cell control has been applied to a stamping trimmer. Many other machines for sheet metal forming have been announced in recent months, and are reviewed here.

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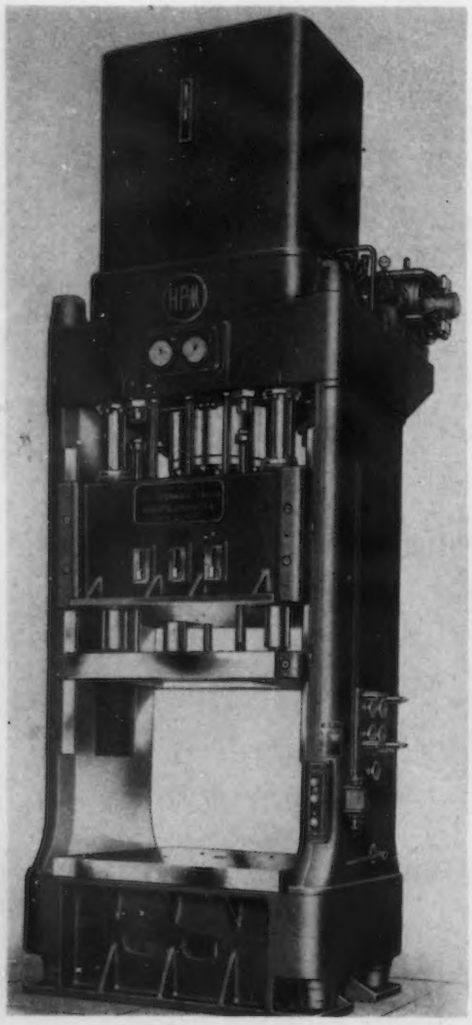
A NUMBER of unique features are to be found in the new H-P-M Fastraverse triple action press, latest development of the *Hydraulic Press Mfg. Co.*, Mount Gilead, Ohio. The press embodies three separate hydraulic actions for operating the main draw punch, the blankholder ring and the die bottom of the regulation triple action drawing die. The power of one radial pump is applied first through the main press ram and thence through other groups of rams to the blankholder slide and die cushion. The blankholder is actuated by four rams at each corner, and the pressure may be varied at each corner, a valuable feature when drawing irregular shapes. In fact, the force on the auxiliary rams may be regulated independent of each other or of the main ram tonnage.

As in other H-P-M units, press ram movements are controlled through regulation of the radial Hydro-Power pump output through a closed hydraulic circuit without the use of valves. Regulation of each of the three hydraulic actions is effected through centralized controls, including four pressure adjustments for the blankholder rams, with a separate gage for each; also a fifth adjustment and gage for the die cushion.

Hydro-Power radial pumps and controls originally developed by H-P-M for its presses are now being marketed for general hydraulic machinery application through a newly-formed company known as *Hydro-Power Systems, Inc.*, Mount Gilead. Besides the well known radial pump,



BELOW

PRINCIPAL specifications of this Birdsboro automatic hydraulic press are: platen area, 146 x 70 in.; inner slide and die cushion, 118 x 46 in.; depth of draw, 24 in. max., double action; 12 in., single action. Inner slide pressure variable up to 550 tons, blankholder up to 185 tons, die cushion up to 185 tons, single action variable up to 735 tons.

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AT LEFT

THREE independent hydraulic actions for operating the main draw punch, the blankholder ring and the die bottom are supplied from a single radial pump in this new H-P-M triple action deep drawing press with Smooth-Line styling.

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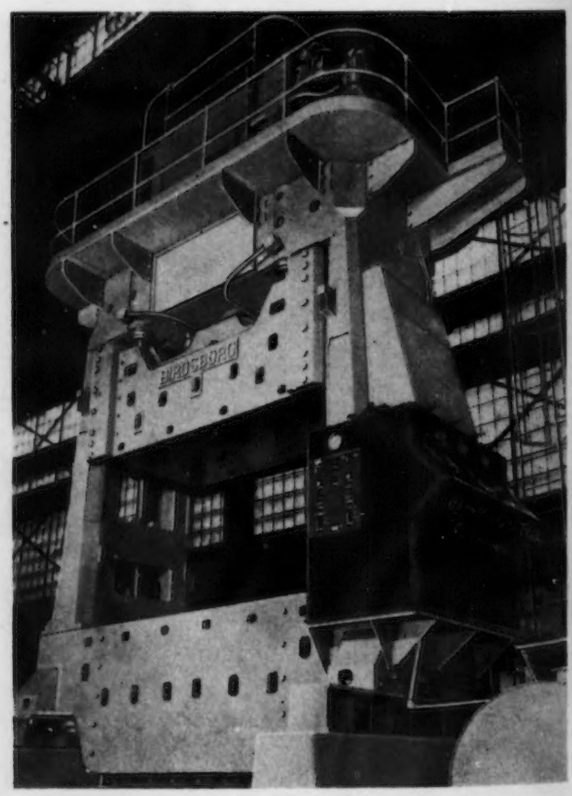

FEATURE RECENT PRESS DESIGNS

the company will sell a gear pump for auxiliary oil circuits, piston valves and other controls.

Automatic Double Action Press

EITHER one of four different sequences may be carried out automatically in a large 735-ton double-action hydraulic press recently developed by the *Birdsboro Steel Foundry & Machine Co.*, Birdsboro, Pa. These sequences can be preset to strip work off the punch or out of the die and draws up to 24 in. can be made. Automatic slowing of the slides just prior to contact allows use of high approach speeds without danger of damaging impact. The press can be operated as a double action type, with conventional inner slide and blankholder slide operated independently, or as a single action unit with the combined areas of both slides as a working area and with combined pressures.

The blank holder pressure is adjustable up to 185 tons and can be

By FRANK J. OLIVER
Associate Editor, The Iron Age

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precisely controlled both prior to and during the draw. Indicators permit presetting of all controls to predetermined strokes and pressures. The press can be built to operate at all practical drawing speeds. The machine shown is one of five just shipped abroad for the shearing, drawing and forming of airplane parts.

High Speed, Single Acting Presses

CONSIDERABLE attention is being given to the design of high speed hydraulic presses of the single acting type built to compete with mechanical types. With a die cushion, they are readily adaptable for drawing operations. Most of the designs brought out in the last few months follow a general pattern. Four are illustrated. In appearance they are streamlined, with clean-cut lines and all the hydraulic pumps, valves and controls concealed within the smooth exterior head case. Control is generally by push button, giving all the flexibility that might be desired, including inching control for die setting. An exception is the French Oil Mill Equipment Co. presses in which hand lever control is used when setting up dies; otherwise operation is by push button. Many of these oil hydraulic presses have recently replaced mechanical types in production lines of the automotive industry.

Straightening Presses

TRAVERSE of the 500-ton hydraulic pressing unit is one feature of a machine for straightening gun barrels and heavy shafting recently furnished one of the arsenals by *A. B. Farquhar Co., Ltd.*, York, Pa. Bed is 26 ft. long and is made of

AT LEFT

ONE of three Southwark Hy-speed hydraulic presses recently shipped to an automobile plant. Capable of making 22 short working strokes per min., the press is rated at 500 tons capacity, has a platen area 48 x 41 in., and has all the hydraulic apparatus contained in the head. The press can be operated manually, semi- or completely automatically. Side housings are cast steel.

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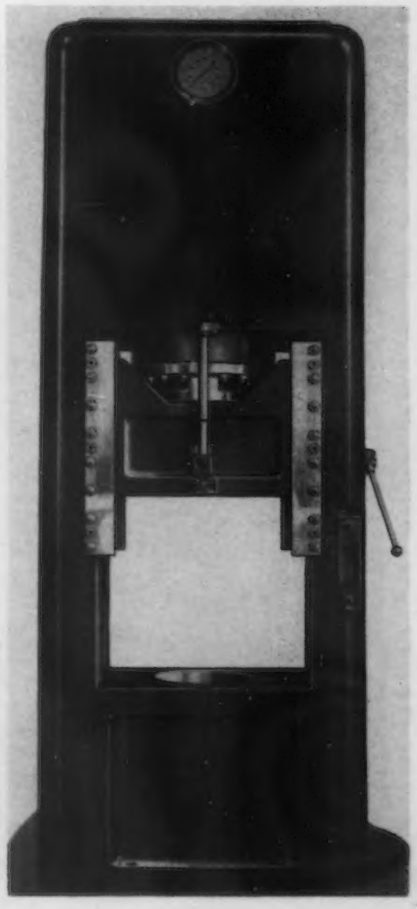
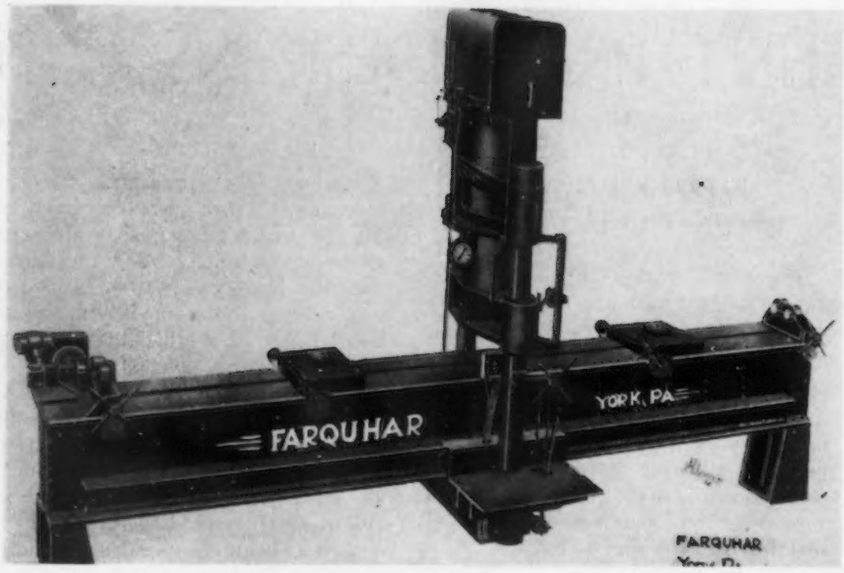
AT RIGHT

SHRUNK-IN columns, top and bottom knockouts and adjustable bronze faced gibs with automatic lubrication are some of the design features of the new line of self-contained hydraulically operated presses for metal forming and stamping, built in capacities from 150 to 1500 tons by the French Oil Mill Machinery Co., Piqua, Ohio. Hand lever and push button control are combined in this unit, which is representative of the streamlined trend in press design.

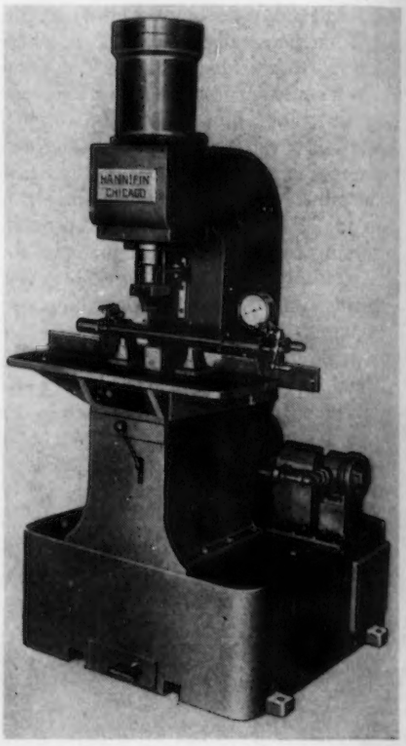




PRESSING unit of this Farquhar 500-ton gun and shaft straightening machine is moved along the structural steel bed while supported on Timken equipped rollers. Provision is made for turning the work by power.

BELOW

AN unusually rapid and sensitive pressure control is claimed for this 20-ton high speed straightening press made by Hannifin Mfg. Co., Chicago, for straightening, forcing and press assembly. Ram movement up or down and pressure control are accomplished by means of a single hand lever or a foot pedal, giving rapid approach at no pressure and follow-up pressure control. A dial gage reads working pressure. The same control is adaptable to other types of Hannifin presses.



BELOW

STROKE of the moving platen is adjustable so that the idle stroke can be reduced to a minimum in this high speed hydraulic press built by the Charles F. Elmes Engineering Works, Chicago. Push button controls include inching. As in similar types, the hydraulic equipment is self-contained in the head. Bed is arranged for a cushioned cylinder.

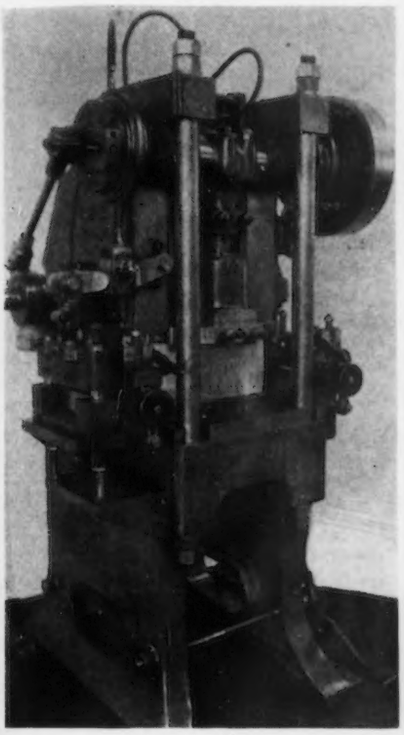
ANOTHER example of the modern trend is found in the new line of Hy-Production Streamliners built in a complete range of sizes and capacities by the Lake Erie Engineering Corp., Buffalo, N. Y. Motor driven pump and hydraulic accessories are enclosed in the head. Centralized push button control is mounted flush on the frame for inching, semi- and full-automatic operation. Moving platen is guided by adjustable gibs with angular surfaces. Space is provided in the bed for a die cushion.

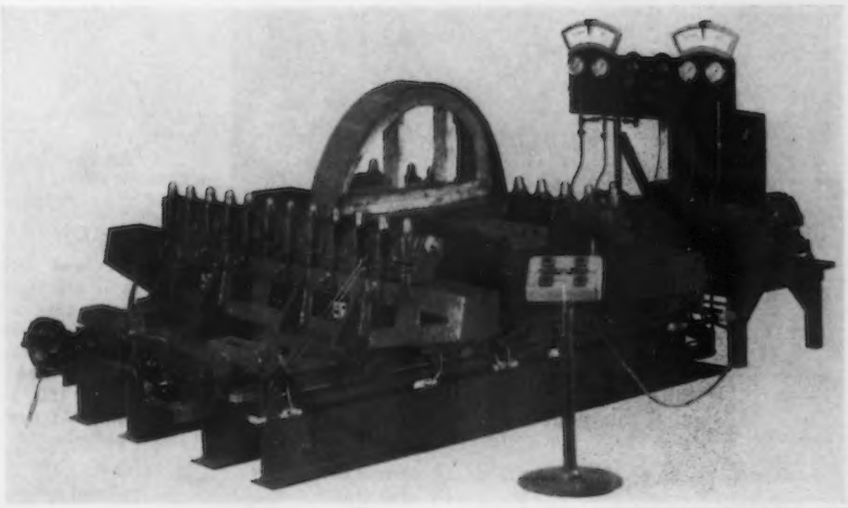
heavy structural steel sections riveted together and machined on the top surface. The pressing unit has Timken equipped wheels to reduce friction and is driven along the bed by rack and pinion at the rate of 10 ft. per min. by a small motor, push button controlled. For exact setting, either inching push button control or handwheel actuation is available.

The table is equipped with a revolving mechanism for checking the work. Straightening is done on pressure blocks which raise the work from the revolving heads. The pressing unit has a self-contained hydraulic unit, with a remote control valve located at the operator's platform. A fast approach speed and a slow straightening speed are provided. For safety, the

BELOW

THE V & O No. 2HS high speed press with automatic feed is capable of operating as high as 600 strokes per min. It blanks strip up to 6 in. wide and will feed up to 3 in. per stroke.





MILD steel sheets up to 60 in. wide and 1/16 in. thick or up to 114 in. wide in thinner material can be formed over simple wood or metal dies in this unusual form of hydraulic stretching press, made by Engineering & Research Corp., Riverdale, Md. Sheet is held at both ends by means of a series of pneumatic hold down clamps on cross beams, which may be swiveled up to 10 deg. Form is placed on table which is elevated a maximum of 12 in. under hydraulic power supplied to two cylinders, individually operated so that the table may be tilted if desired. Total maximum pressure is 150 tons.

pit in front of the machine is covered with an automatic cover that follows the motion of the pressing unit along the bed.

Double Crank Presses

SERIES 50 double crank, straight side presses are a new line recently introduced by the *Minster Machine Co.*, Minster, Ohio. They have improved box type sections for the frame members. Slide ways are amply long and during the working part of the stroke, the entire length of the gib affords a bearing surface. The box type crowns have a section below the centerline of the crankshafts, as well as above. For the larger sizes, slide counterbalance cylinders are mounted in the crown. The presses are powered by either air or hydraulic combination friction clutch and brake, controlled electrically with push buttons. Wiring and control panel are fully enclosed. The centralized lubricating system is also fully enclosed.

Inclinable Presses

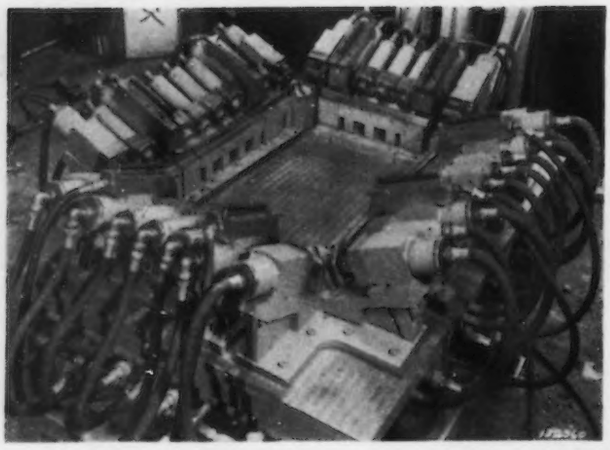
MINSTER is also offering a new line of open back inclinable presses in nine sizes ranging in capacity from 12 to 113 tons. The frames are of a high tensile strength, alloyed semi-steel cast construction. The upper part is a box type design with 45-deg. overhanging crankshaft bearings, which have nickel bronze bushings. Anti-friction bearings are used on the driveshaft and clutch wheel. Slides and gibs have been lengthened to increase the bearing surface, and bronze ball and socket bushings have been

AT LEFT

MINSTER series 50-4½-42 double crank straight side press of 74 tons capacity has a bed length of 42 in. Clutch control is by push buttons on the right column.

BELOW

THE Colonial Junior broaching and assembly press, made by Colonial Broach Co., Detroit, is a bench type rated at ½-ton capacity and standing only 31 in. high. It is a completely self-contained unit with motor driven 1000-lb. pressure pump. Platen measures 8 x 12 in. and there is 5 in. clearance between ram and machine frame. Stroke is adjustable up to 10 in.



ABOVE

WITH only minor adjustments, from 22 to 52 holes in the transverse flanges of five different size refrigerator door panels can be punched by means of the hydraulic punching and stripping fixture shown. Eight hydraulically operated hold-down pads position and secure the work, and 26 hydraulic punching units are arranged around the fixture. A reciprocating air-hydraulic booster supplies the necessary pressure to the punches. Stripping is mechanical. This application in the plant of the Nash-Kelvinator Corp., Detroit, is an adaptation of the hydraulic punching units made by the Progressive Welder Co. and first described in the Feb. 16 issue of THE IRON AGE, page 44.

incorporated in the slide joint. The multi-engage spline clutch having 10 to 22 points of engagement is standard equipment on these presses. The brake shoe is a two-piece assembly, with oil-proof molded lining.

AN electrically controlled, hydraulically operated friction clutch and brake is one of the features of the new and larger size No. 13 I open back inclinable press, rated at 150 tons capacity, made by the *Cleveland Punch & Shear Works Co.*, Cleveland. It gives instantaneous action when it is tripped and may be stopped at any position by means of a push button. Furthermore, the clutch capacity may be varied by changing the hydraulic pressure. Brake is spring loaded and is automatically applied should the electrical or hydraulic power fail. Clutch, brake, flywheel and motor are mounted between the uprights in the rear of the press. Crankshaft frame bearings and connections are bronze bushed, whereas the drive shaft and clutch are mounted on roller bearings. Drive is by V-belt from a high speed motor.

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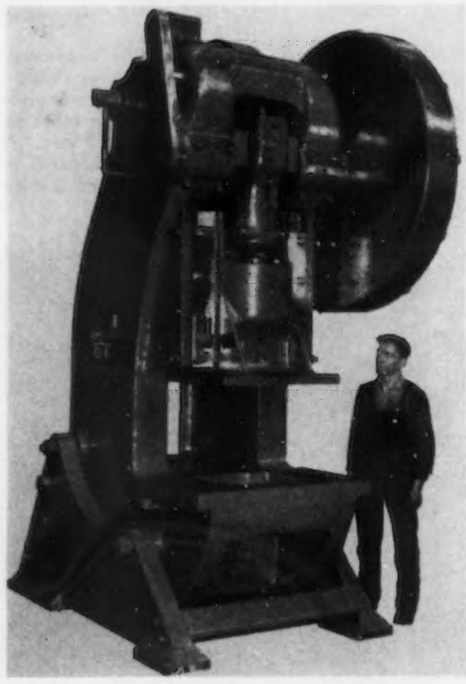
BELOW

A NEW and larger size is the No. 13 I Cleveland open back inclinable press, which has a bed area of 30 x 45 in., stroke of 6 in., capacity of 150 tons and speed of 35 strokes per min.



High Speed Blanking Press

FEATURES have been incorporated in a new high speed blanking press produced by the *V & O Press Co.*, Hudson, N. Y., that are said to make it extremely accurate, rigid and fast, yet retaining complete accessibility. This No. 2HS press is capable of operating up to 600 strokes per min. Body, bed and legs are cast integral for rigidity and the throat is made very shallow and the opening in the bed small. The body is designed to receive tie rods with spacing tubes to cut down deflection, giving the effect of a straight side press with the accessibility of an inclinable.

Feeds are located on both sides of the machine and are adjustable to compensate for die wear. They can be swung out of the way when making die changes. Drive to these feeds is by an adjustable crank at the end of the eccentric shaft through a friction clutch mounted on a backshaft. The upper rolls are equipped with individual release levers for use in starting the material through the rolls. Each feed is provided with an individual brake on the lower roll shaft as well as a common brake on the back shaft. An adjustable scrap cutter is incorporated.

Bending Presses and Brakes

A NEW line of small bending presses, to handle material 10 ft. long and 10 gage and under, is being marketed by the *Steelweld Machinery Sales Division of Cyril Bath & Co.*, Cleveland, under the trade name.

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STURDYBENDER is the name given a new line of light duty bending presses or brakes introduced by the Steelweld division of Cyril Bath & Co.

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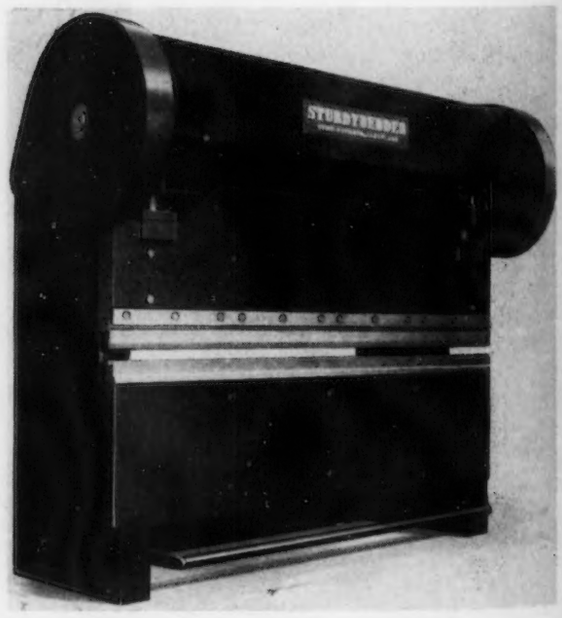

Sturdybender. This line is separately manufactured on a production basis under Steelweld patents and combines the main features of the standard Steelweld bending press, modified for lighter work. The machines have a one-piece, all-welded steel frame and heavy crown. Other features are tapering rams with slides that are self-compensating for wear, forged eccentrics, twin gear and double gear drive, anti-friction bearings, except for the main bearings, which like the eccentric bearings are bronze bushed. Frame stability is stressed. The bed and ram take standard brake punches and dies.

WELDED steel construction is being used in the improved line of *Long & Allstatter* power press brakes now being manufactured by the *Columbia Machine Tool Co.*, Hamilton, Ohio. These brakes are made in a range of sizes up to 16 ft. and to bend gages from 16 gage to ¾ in. On the larger sizes the eccentric shaft is driven by twin gears at both ends of the machine. Clutch is of the multiple disk type and the brake is a friction band type. Adjustment of the slide is made through a high torque motor and reversing controller. Slide guides are long and have a two way adjustment for both endwise as well as sidewise movement.

Main drive is by V-belt to the flywheel, which is mounted on roller bearings. The intermediate gear is bronze bushed and revolves on a fixed stub shaft, making a compact arrangement.

o o o

AT RIGHT

PASSING of the operator's hand through a light beam at the right interrupts the photocell circuit and starts the automatic cycle of operation of this Quickwork stamping trimmer for round work. Movement of the pressure rolls toward the cutter spindle is effected pneumatically.

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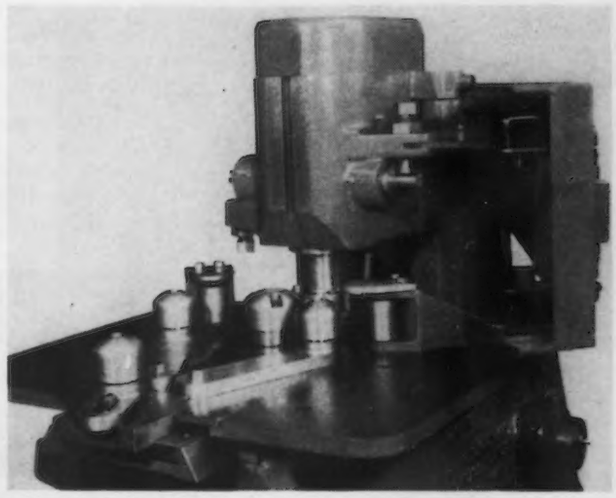
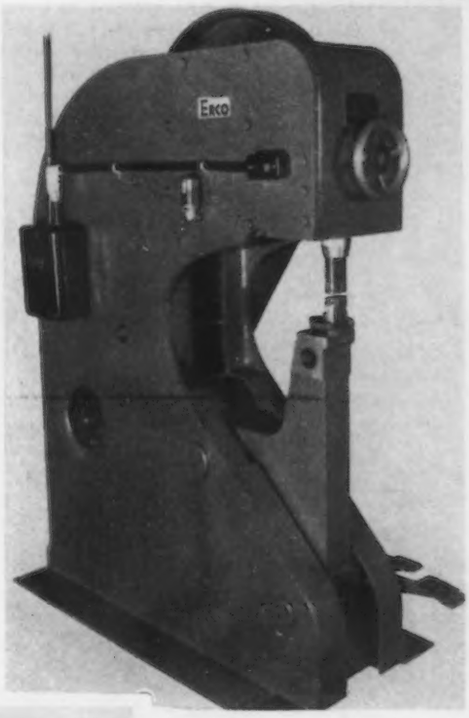
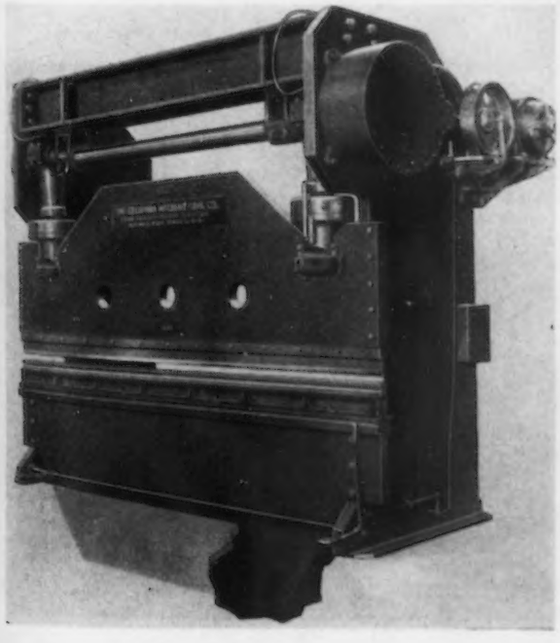




AT LEFT

ESPECIALLY designed for aircraft work is the Erco sheet metal shrinker for reducing the length of a piece of metal in a localized area. It can be used for bending angles and channel members as well as sheet work. Two pairs of identical interlocking jaws are used, the upper one being attached to a reciprocating ram, the lower to a fixed steel post. The jaws are two wedge shaped pieces of tool steel resting on inclined surfaces of the anvils and held apart by springs. The working surfaces are parallel to each other and are roughened to aid in holding the work. The stroke of the ram is so adjusted that it travels beyond the point where the work is gripped at two points and forces the jaws to slide down the inclined surfaces of the anvils, thereby compressing the work, reducing the length and increasing the thickness. Under normal conditions the only surface change is a loss of polish, although much more rapid shrinkage can be obtained with serrated surfaces if the marks left are not objectionable. This machine is another recent product of Engineering & Research Corp., Riverdale, Md.



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A COMPACT, enclosed gear drive at one end of the frame is featured in sizes 25 to 150 of the improved Long & Allstatter press brakes, now made by the Columbia Machine Tool Co. Larger sizes have twin gear drive.

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Stamping Trimmer

PHOTOELECTRIC control has been substituted for foot treadle operation of a stamping trimming machine made by the *Quickwork Co.*, 400 W. Madison Street, Chicago. The original machine, which is in effect a rotary shear with its cutters mounted on vertical shafts, was described in THE IRON AGE, June 16, 1938, p. 47. In the new set-up, when the stamping is in position on the horizontal table, the operator simply passes his hand through a light beam focused on a *General Electric* phototube and the machine automatically starts to trim the stamping. The trimming operation is timed by a G-E vacuum tube timer relay so that at the completion of the

BY substituting a set of heads, flanging can be done on this Quickwork throatless shear which handles stock of any practical width or length.

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PARTICULARLY designed for use in the aircraft industry where large numbers of light rivets must be driven is the new Thor size PRS—1 pneumatic rivet squeezer, which weighs only 7½ lb. without the yoke.

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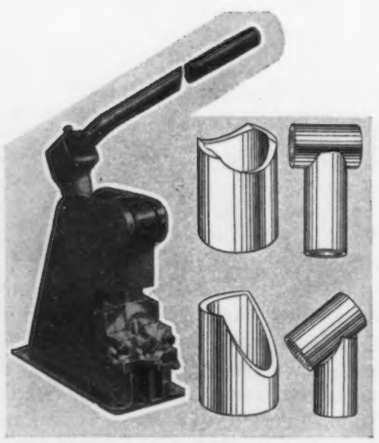
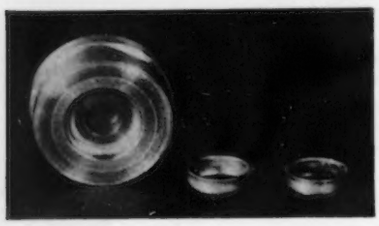


PIPE and tube ends can be prepared for welding with the Dreis & Krump Arc-Fit tool of sub-press design which can be used in any press with 7 in. of die space or in the special hand press shown.

cut, the machine opens automatically for unloading. In trimming simple, round stampings the estimated production is 120 trimmed pieces per hr.

Another new development of the *Quickwork Co.* is a combination throatless shear and flanger of compact construction, furnished either as a bench unit or pedestal mounted. As a



STEEL die with Kennametal carbide insert shrunken into it, from which 11,000 chair casters have been stamped out without any sign of die wear. As many as 70,000 casters have been produced before the first regrind. Kennametal is a product of McKenna Metals Co., 144 Lloyd Avenue, Latrobe, Pa., and is basically an intermetallic compound of tungsten-titanium carbide, corresponding to the formula $WTiC_2$.

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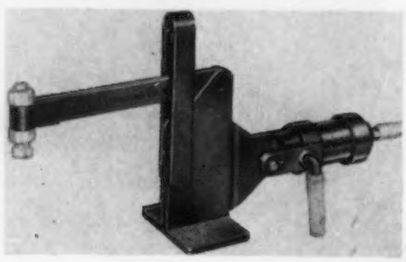
shear, it handles all straight and irregular cutting on both concave and convex surfaces. Material of any width or length can be cut with the self-feeding rotary cutters. A change of heads converts the machine into a flanger and attachments are available



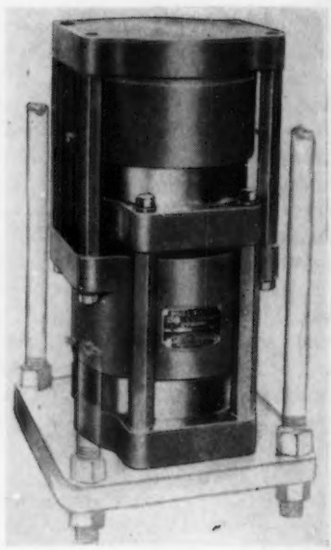
ATTACHED to an air line and operated with a Ross air control valve, this new De-Sta-Co toggle clamp with built-in air cylinder is said to be particularly useful on fixtures requiring multiple clamping operations, as for holding large sheet metal panels. One air valve can control many clamps at a time. Made by the Detroit Stamping Co., 3463 Fort Street West, Detroit.

o o o

for Uing, wiring and special forming. The machine is equipped with ball bearings throughout and has two cutting and flanging speeds.

Pneumatic Rivet Squeezer

PARTICULAR attention has been paid to interchanging plungers and cuppings on the job in a new type of



WHEN the press bed opening is limited it is possible to double or triple the normal ring holding pressure through the use of the new tandem pneumatic die cushions made by the Dayton Rogers Mfg. Co., 2830 13th Avenue South, Minneapolis. These cushions are made in five sizes having a piston diameter from 10 to 18 in. and can be furnished in single, double or triple units with press mountings as shown. General utility pneumatic die cushions are being made in six sizes having piston diameters ranging from 6 to 16 in. in steps of 2 in. and corresponding drawing capacities from 3 to 7 in. These C models are furnished with an air regulator and gage which maintains a predetermined constant pressure on the cushion cylinder at all times.

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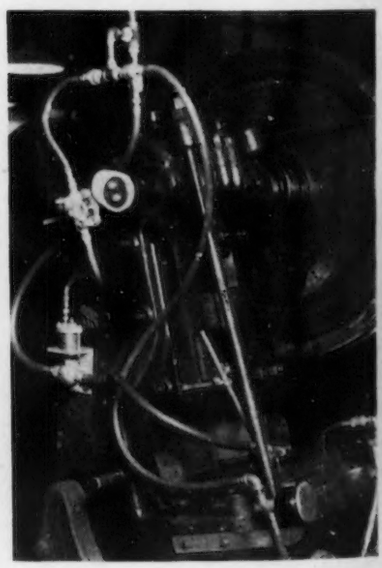
ESPECIALLY useful on manually fed presses using overhead knockout or compound dies is a new pilot valve designed to give a delayed or prolonged blast of air for ejecting work from a press after the ram has stopped its upward motion. The duration of the blast may be regulated by a screw adjustment on the valve. With vent closed, it may be used as an air control valve on any mechanism. Made by A. Schrader's Son Division of Scovill Mfg. Co., Inc., 470 Vanderbilt Avenue, Brooklyn.



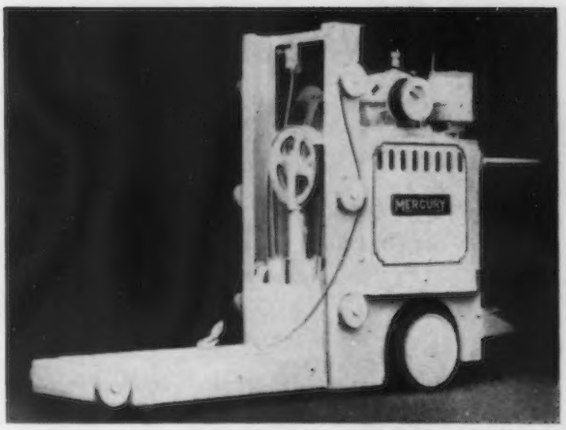
pneumatic rivet squeezer recently announced by the *Independent Pneumatic Tool Co.*, 600 W. Jackson Boulevard, Chicago. This Thor rivet squeezer has been designed for use with 5/32-in. steel and 3/16-in. dural or aluminum rivets. It is just 12 in. long and weighs 7½ lb. Where few jobs are alike, the plunger can be quickly installed and removed simply by pushing the plunger holder back with the fingers. Another feature is a pressure regulator that permits the operator to regulate the pressure so that both short and long rivets can be driven during the same operation without changing the yoke or plunger.

An adjustable stroke regulator also facilitates speed in riveting. The yoke frame is made to receive standard yokes with 1⅝-in. spacing between the bolt holes.

Arc Shearing Die

ARC-FIT is the name given a new sub-press design of shearing tool for preparing pipe and tube ends for welded T-joints, bevel joints and double T-connections. These tools can be used in any punch press having 7 in. or more die space and the necessary capacity. A special hand press for pipe sizes up to 2 in. is also supplied by the maker, *Dreis & Krump Mfg. Co.*, 7400 S. Loomis Boulevard, Chicago. A different size Arc-Fit is used for each size pipe or tubing. In making a T-fit, two operations are required, rotating the pipe 180 deg. between them. In pressure piping work, a hole is first cut in the wall with a circular end saw and then the lead-in is sheared with an Arc-Fit tool.

MODEL A-1006 electric die handling truck, made by the Mercury Mfg. Co., 4044 S. Halsted Street, Chicago, is rated at 4000 lb. capacity and has a platform 24 in. wide by 48 in. long. Lowered height is 9 in.; elevated, 52 in. Loading and unloading of dies is facilitated by the motor driven, double drum winch operating from the truck battery. Cable sheaves are conveniently located on the uprights and also at the end of the table for reversing the direction of pull when removing loads from the platform.



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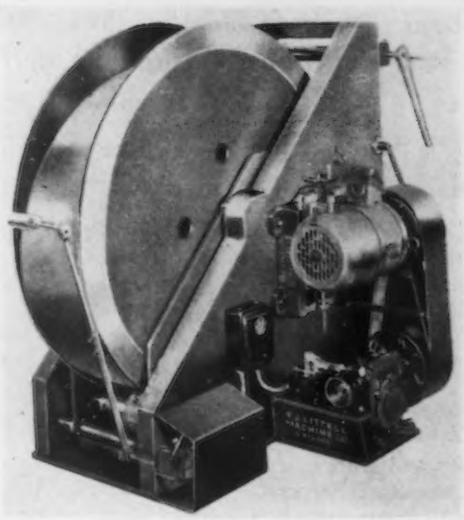
COILS from 1 to 8 in. wide and weighing up to 3000 lb. can be handled in a new type of cradle reel made by the F. J. Littell Machine Co., Chicago. Coil is supported on knurled collars mounted on two parallel shafts carried in self-alining roller bearings. Drive is by a 2-hp. motor and variable speed drive. A magnetic brake is applied should a loop form as a result of unwinding too fast. Idling side guide disks are used when handling thin stock about 0.015 in. thick.



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Tube Drawing Compound

A STABLE paste compound of high titer fats has recently been developed by *National Oil Products Co.*, Harrison, N. J., specifically for the lubrication of heavy draws in the wet working of copper and brass tubes, but also useful for drawing heavy brass and copper shells. It is readily soluble and is effective in 5 per cent solution. Because it consists primarily of vegetable fats, it is not subject to the development of odor or rancidity on drawn stock.

HIGH delivery speeds combined with high accuracy as to straightness, size and finish are claimed for a new straightening, sizing and burnishing machine for round bars and tubes recently introduced by Taylor-Wilson Mfg. Co., McKees Rocks, Pa.

The machine is of the cross-roll type, equipped with indicators that show the exact position and angle of the rolls so that resetting for different sizes can be quickly accomplished. Provision is also made for quick change of the rolls themselves.

THIS WEEK ON THE ASSEMBLY LINE

° ° °

By W. F. SHERMAN
Detroit Editor

° ° °

. . . Output rises after strike settlement, and hopes are lifted by sales reports . . . FTC report on automotive profits proves point of interest in Detroit . . . GM announces hospital and surgical benefit plan for 200,000 employees . . . Buying activity continues on sidewise drift despite "bargain days."

DETROIT—Reflecting the settlement of the Briggs strike and optimism generated by a strong sales spirit, output of automobiles in the United States and Canada increased last week to 65,265 units, compared with 32,445 in the preceding week when strikes and holiday shutdowns trimmed production sharply. Activity was substantially better than a year ago when the corresponding week saw assembly of only 42,175 cars and trucks, according to Ward's Automotive Reports.

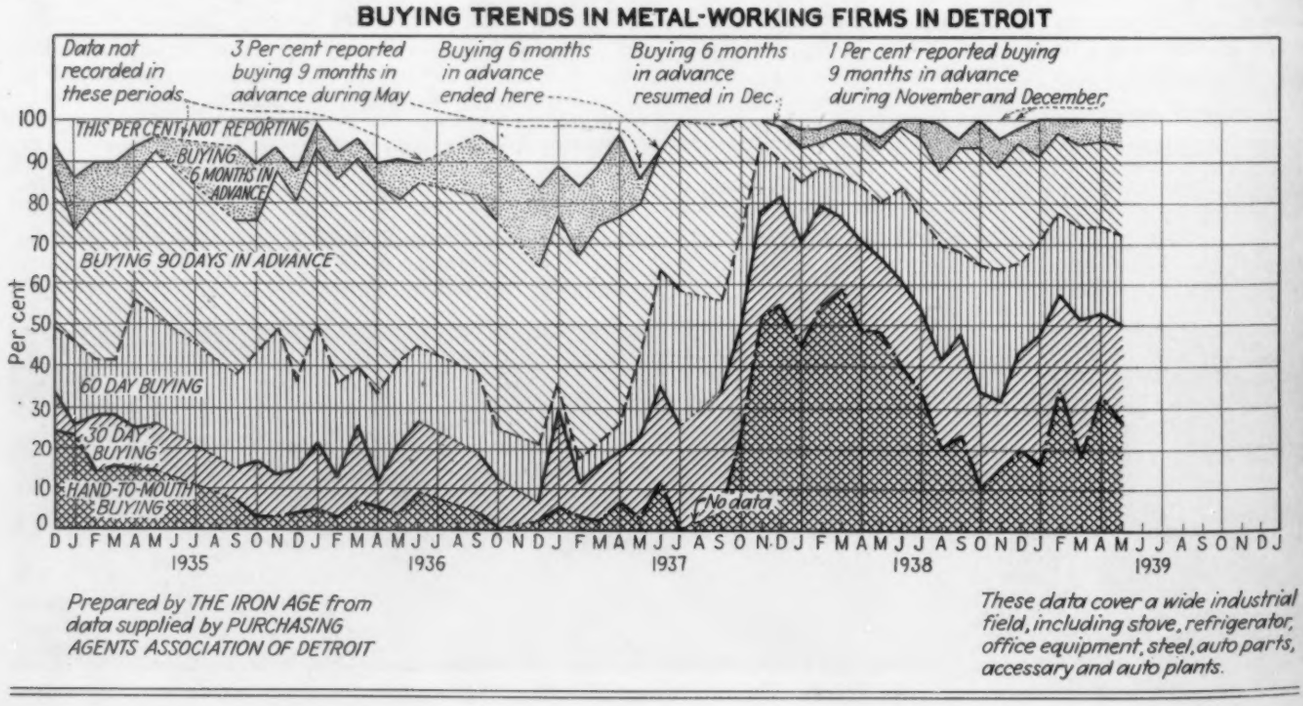
Briggs, Chrysler and Lincoln-Zephyr operations were back on a normal basis by the end of the week. Chrysler's total production was 8145 compared with 1100 in the previous week; 3570 of the total represents Plymouth assemblies. Ford-Mercury increased from 1600 to 17,500, and the Zephyr plant reopened to turn out 160 units. Chevrolet operated up near pre-holiday levels with 18,000 output compared with 14,000 in the previous week. The General Motors total increased from 23,620 to 30,640.

These general increases in the industry were accompanied by a move within the Chrysler Corp. to make up the production lost during the Briggs strike. This has led to an upward revision in the Ward's estimate of June production from 225,000 units to 275,000.

Hopes have been lifted by the encouraging strength in automobile sales, which included gains in the last 10 days of May compared with the second 10-day period (Pontiac up 8 per cent), and outstanding advances such as the one made by Packard which gained 56 per cent over April. Packard executives find a cheering note for business in general in the fact that deliveries of the larger, more expensive Packard cars were up sharply. Super-eight deliveries for May exceeded those for May, 1938, by 123 per cent. Packard Twelves, the most costly cars, gained 81 per cent. Ford sales in May were 12 per cent better than in April and the new Mercury gained 20 per cent.

Principal comment aroused in Detroit by the Federal Trade Commission report on the automotive industry centered on the analysis of the profit situation, which in reality was intend-

BUYING TRENDS IN METAL-WORKING FIRMS IN DETROIT


Data not recorded in these periods
3 Per cent reported buying 9 months in advance during May
Buying 6 months in advance ended here
Buying 6 months in advance resumed in Dec.
1 Per cent reported buying 9 months in advance during November and December
THIS PER CENT NOT REPORTING
BUYING 6 MONTHS IN ADVANCE
BUYING 90 DAYS IN ADVANCE
60 DAY BUYING
30 DAY BUYING
HAND-TO-MOUTH BUYING
No data
Per cent
100
90
80
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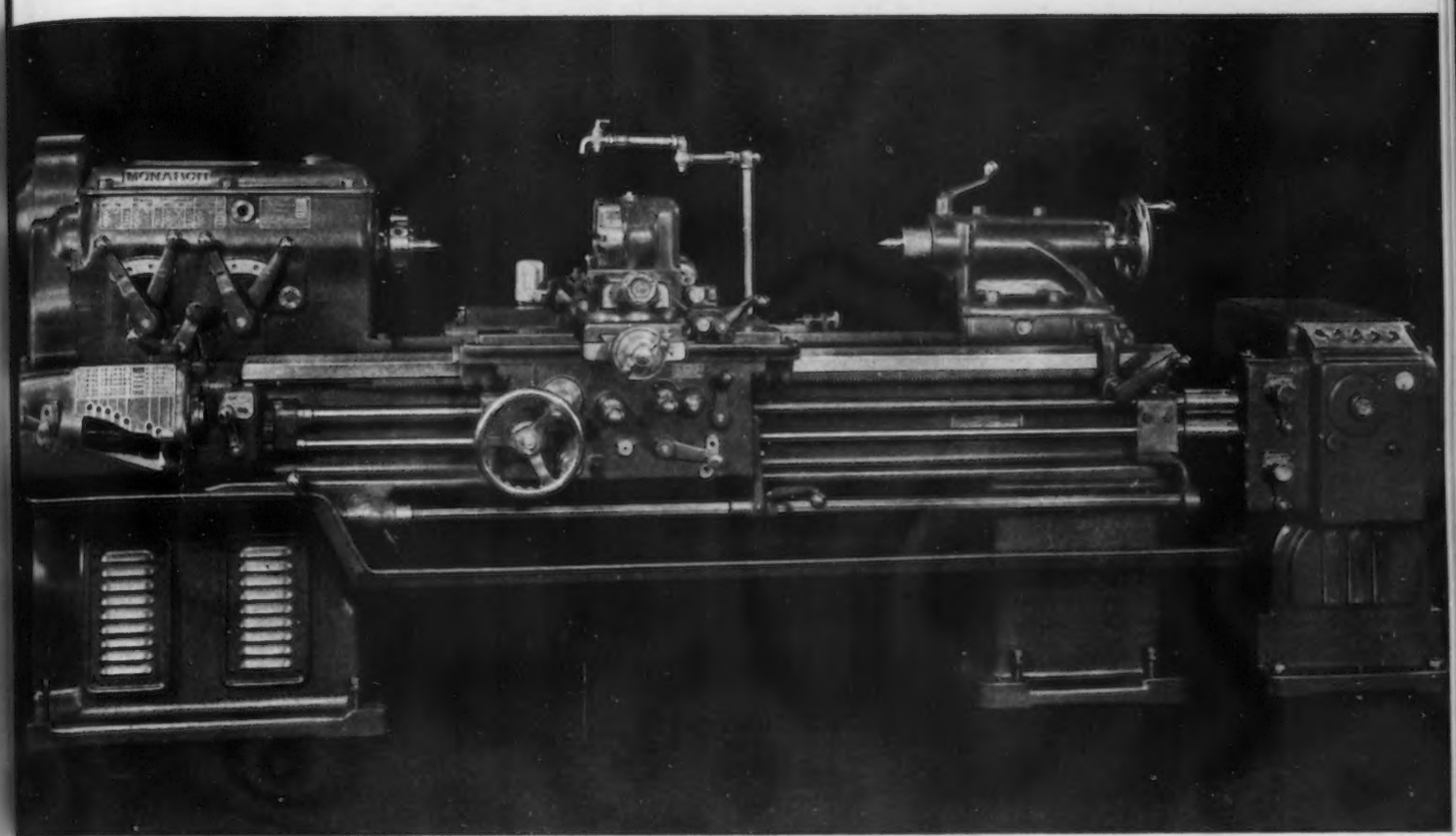
1935
1936
1937
1938
1939

Prepared by THE IRON AGE from data supplied by PURCHASING AGENTS ASSOCIATION OF DETROIT

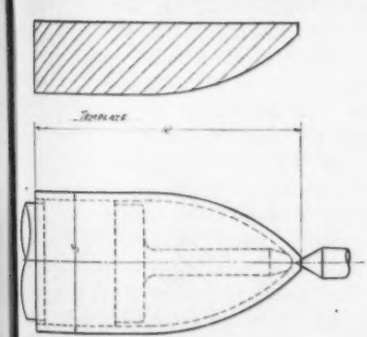
These data cover a wide industrial field, including stove, refrigerator, office equipment, steel, auto parts, accessary and auto plants.

MAKE MORE MONEY WITH MONARCHS

ON JOBS LIKE THESE!



A MONARCH 18" x 48" LATHE EQUIPPED WITH AUTOMATIC SIZING CONTROLS



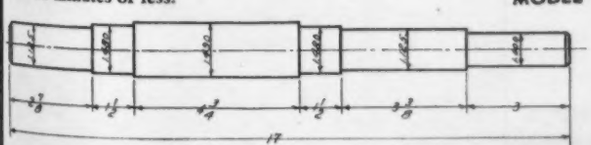
Job No. 2 (Above)

TURN FROM TEMPLATE

Material—SAE-1035.
Peripherial Speed—feet per minute 327.
Feed—.017".
Time per cut—3.43 minutes.
*Set-Up time—5 minutes or less.

Job No. 1 (Below)

Material—SAE-1035.
Speed—feet per minute 300.
Feed—.017".
Tolerance on diameters and length ±.002"
Total machining time both ends of Shaft—2½ minutes.
Total Set-Up time for diameters and lengths —10 minutes or less.



AUTOMATIC SIZING controls convert any size Monarch lathe into an *automatic* machine suitable for automatic production of large or small quantity lots.

The jobs shown on this page are done in small lots on Monarch Standard Lathes equipped with AUTOMATIC SIZING Controls. One operator easily attends two or more lathes because the machining cycle is automatic.

Monarch AUTOMATIC SIZING Controls can readily be applied to any size of Monarch engine lathe, or tool room lathe . . . to help you "MAKE MORE THINGS FOR MORE PEOPLE AT FAR LESS COST."

We are qualified to help you meet today's manufacturing problems. Let us show you the savings you can make by putting much of your lathe work on an *automatic* basis.

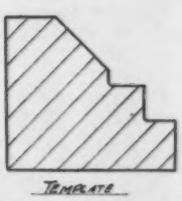
Bulletin No. 182 fully explains the AUTOMATIC SIZING controls on Monarch lathes. A copy will gladly be sent to you on request.

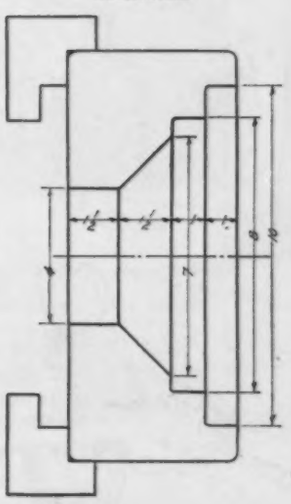
MONARCH LATHES cover the turning field and include:

AUTOMATIC SIZING
ENGINE LATHES
Hydro-Matic **LATHES**
MONARCH KELLER LATHES
5-T MANUFACTURING LATHES
10" SENSITIVE PRECISION LATHES
MODEL "C" TOOL ROOM LATHES

Write for Catalogs

*On jobs No. 2 and No. 3, some additional time per piece can be saved by using the Monarch CONSTANT SURFACE CUTTING SPEED CONTROL. This development has been successfully applied to Monarch lathes in recent years.





Job No. 3

STEP BORE FROM TEMPLATE

Material—cast iron.
Peripherial Speed—feet per minute 288.
Feed—.017".
Time per cut—3½ minutes.
*Set-Up time—5 minutes.

THE MONARCH MACHINE TOOL CO., Sidney, Ohio, U. S. A.

MONARCH LATHES
COVER THE TURNING FIELD
SIDNEY · OHIO, U.S.A.

Chicago Sales Office: 622 W. Washington Boulevard • Indianapolis Sales Office: 3115 North Meridian Street • Newark Sales Office: 1060 Broad Street. • Pittsburgh Sales Office: 604 Chamber of Commerce Bldg. • *Agencies in principal industrial centers of this and foreign countries.*

ed to be only a sidelight of the whole analysis. In the 11 years between 1927 and 1937, the commission found, the seven largest manufacturers made profits amounting to more than $2,375,000,000 before paying income taxes. Of this total, General Motors Corp. made no less than 79.7 per cent and Chrysler Corp. 11.6 per cent.

Ford Motor Co. made only one-tenth of 1 per cent of the total profits for the industry. The report indicated that Ford profits have come entirely from sales of accessories and replacement parts. On manufacturing cars alone, in the 11-year period, it lost eight-tenths of 1 per cent.

Another 8.6 per cent of the total profit of the industry was scattered among four smaller companies.

On the basis of percentage of profit on volume of sales, General Motors averaged 35.5 per cent; Chrysler 28.59 per cent; Hudson (from 1927 to 1938) 9.40 per cent; Nash 36.90 per cent; Packard 21.25 per cent; and Studebaker 6.13 per cent.

FTC reported that the Ford company experienced heavy losses in the severe depression years and also in 1927 and 1928 when changing models and reconstructing its factory. Largely the explanation of Ford's relative position is the tremendous cash outlay for plant expansion and reconstruction; witness, the $34,000,000 program just completed. But the statistics recall Henry Ford's reported comment of a few years ago, that he would be satisfied just to break even on his operations since he had no need for more money.

These truly gargantuan figures were merely a by-product of the FTC investigation, which was begun through the efforts of Gardner R. Withrow, a representative from Wisconsin who failed of re-election last fall. The probe was instigated largely by the automotive retail trade, which has been seeking to correct inequalities in the franchise agreements of automobile manufacturers with their dealers. The report, which covers 3575 typewritten pages, was submitted to Congress without recommendation of legislation.

GM Expands Group Insurance

The General Motors group insurance plan, which has been in operation since Dec. 1, 1926, has been augmented by a hospitalization and surgical benefit plan in the form of an insurance for which the employee will pay 75c. per month. Hospitalization benefits of $4 a day, as long as 70 days for a single disability, are provided. In addition, there are benefits toward defraying costs of surgical operations up to $150 for a single operation. The plan also provides for payment of certain specified hospital services in addition to the $4 a day and the surgical benefits. The corporation will assume a share of the costs, as it does in its other insurance plan which provides life insurance and sick and non-occupational accident benefits. The new plan is probably the largest group hospitalization plan ever undertaken in the United States. It is available to the corporation's 200,000 employees in the United States and Canada. Recently Ford announced a group insurance plan similar to GM's earlier one.

Buying Trends Unchanged

Buying trends in the Detroit area showed little substantial or significant change during the month of May despite the reported volume of orders and commitments for steel during the "bargain days." There was slightly less hand-to-mouth buying, percentage for May being only 27 per cent compared with 31 per cent for April. Besides this, 23 per cent of the purchasing agents reporting to the Purchasing Agents Association of Detroit were holding themselves to a 30-day schedule, so the total percentage under this important line on the chart was 50 per cent—not at all an important change from the previous month's 53 per cent. The 60- and 90-day buyers, also those operating within a six-month range, showed no important change, the percentages being 22 per cent, 22 per cent and 6 per cent respectively for May (each one point higher than in April). The performance is in marked contrast to the normal spring behavior of buying trends and falls somewhat short of earlier expectations for this month.

The Briggs strike settlement was reached in the middle of last week with no actual gains for the union, although strike leaders read into the contract the idea that the UAW-CIO was recognized as sole bargaining agent. All the strike did, besides accounting for lost time of 70,000 workers, was to settle the fact, for the time being, that the union will not have closed shop privileges.

Ford's willingness to go afield in search of light-weight materials and alloys for his new tractor is indicated by the fact that a large control quad-

THE BULL OF THE WOODS — BY J. R. WILLIAMS

THE OL' BULL O' TH' WOODS IS PRETTY FOXY -- HE'S MAKIN' HIS GRANDCHILDREN LEARN TO RIDE, PLAY POLO, SWIM, PLAY BRIDGE, TENNIS, GOLF AN' ALL TH' SPORTS WHILE THEY'RE VERY YOUNG
WHUT'S FOXY ABOUT THAT ?
DIDN'T YOU SEE TH' BULL WITH RIDIN' BOOTS AN' BRITCHES ON A WHILE BACK ? WELL, HE SPENT SO MANY YEARS IN PURSUIT OF HAPPINESS THAT WHEN HE CAUGHT IT HE FOUND IT WAS MISERY-- SO HE'S MAKIN' TH' KIDS LEARN EARLY
J.R.WILLIAMS
COPR. 1939 BY NEA SERVICE, INC. T. M. REG. U. S. PAT. OFF.
OLD MAN EXPERIENCE
6-9

rant is being made of a magnesium alloy casting for which permanent molds are to be constructed.

Graham has announced the adoption for immediate production of an improved type of overdrive to be called the Autoshift cruising gear. It increases economy of going into operation at 30 instead of 40 miles an hour. Principal advantage is a device which permits the driver to shift back into conventional gear for rapid acceleration. All the driver has to do is push the accelerator pedal all the way down —slightly beyond full throttle position —to bring conventional gear into operation in an emergency or to provide the zip necessary to pass another car quickly.

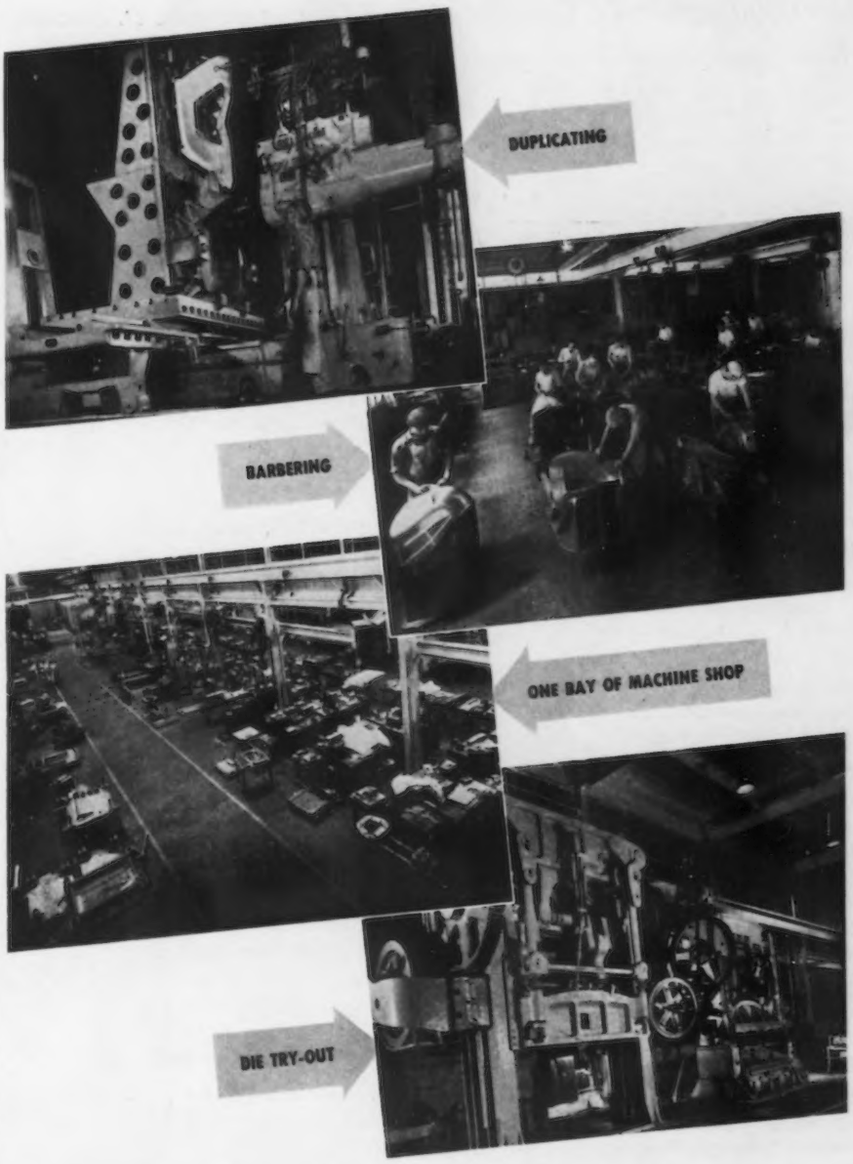
Watching Studebaker

The industry has been watching Studebaker's Champion closely. Just the other day an engineer for a competitive corporation revealed privately that his group had just completed extensive durability and performance tests on the $660 car and found that it stood up unusually well. At the time, it was being torn down for detailed inspection and the engineer expressed surprise at the quality of various parts and the unusually light weight. Off the record, he confirmed the Studebaker claim that light weight was really "designed into" the Champion. Seldom have more favorable comments about a competitor's product been uttered.

The Studebaker company has just announced a new long-distance economy record for six- and eight-cylinder automobiles. The Champion, a six, has completed a round trip between the San Francisco Exposition and the New York World's Fair under AAA supervision. Equipped with overdrive transmission, it traveled 6144 miles, averaged 40.85 miles per hour and delivered 27.26 miles per gal.

Automobile promotional methods are given a new twist by Studebaker which will supply a complete record of cost, not only for operating the car, but for lodging and meals consumed on the trip, plus all other expenses "which will inform everybody what it costs to visit both World's Fairs in a Studebaker Champion." Another of the newer phases of automobile promotional work is Chevrolet's Post-Graduate School of Modern Merchandising and Management, which is opening its sixth session offering an eight-week course on the operation of an automotive retail dealership. All students are sons or relatives of Chevrolet dealers. The course includes work in business management, advertising and public speaking, among other things.

TOOLMAKERS —DIEMAKERS



THE new Cimatool Plant is an excellent answer to industry's demand for a complete modernization of tool and die making. This plant brings every phase up to this year's standards of progress, efficiency and economy. It is adequately equipped for both large and small work and has a thoroughly experienced organization for both design and fabrication.

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DIEMAKERS • • TOOL MAKERS

MACHINE TOOLS

THIS WEEK IN WASHINGTON

. . . Railroads protest Government's abuse of carriers' land grant rates . . . ICC reorganizes to end delays in its work . . . $100,000,000 stock pile bill signed by President . . . Senate clears way for low-cost farm housing.

o o o

By L. W. MOFFETT

Washington Editor, The Iron Age

o o o

WASHINGTON — Widespread abuse by the Government of railroad land grant rates, resulting in greater discrimination between manufacturers and heavier loss of revenue to the carriers, was strikingly shown by R. N. Nash of the traffic department of the Association of American Railroads in testimony last week in support of bills to repeal land grant rates. The hearings were held before the Senate Committee on Interstate Commerce.

Government groups, apparently instructed not to directly, oppose repeal, have by an oblique method, turned to a new device to frustrate the move. They have suggested that repeal of land grant rates should be made conditional upon return to the Government of land given the carriers now remaining in their hands or in litigation, about 3,000,000 acres in the former and approximately 9,000,000 acres in the latter class.

Broadly the Government departments present as their reason for opposition to repeal the increased transportation charges they would have to pay. There also is the unexpressed but realistic opposition coming from the army of *Government* employees engaged in the complicated task of figuring out land grant routes and rates, scaling down to the last penny the lowest charges that must be paid to the railroads.

Require 50% Cut

The land grant statutes, passed in the period from 1850 to 1870, require a 50 per cent reduction in the freight charges for the handling of Government freight over the affected railroads. Mr. Nash said that even assuming the justice of continuing the land grant statutes, the deduction of 50 per cent is too great. He expressed doubt that, in many instances, after applying the reduction, the railroads are receiving the out-of-pocket cost of transportation.

He declared that these reduced rates are applied today on a tremendous volume of tonnage which was not contemplated when the land grant contracts were made. Because of the recent development in governmental activities which brought about an enormous diversion of freight tonnage from commercial to governmental traffic, Mr. Nash said that the Government probably is the largest individual shipper of freight in the country. In speaking of enlarged governmental functions of the past few years, Mr. Nash mentioned particularly the establishment of relief organizations which get the benefits of land grant rates.

Four-fifths to Railroads

He submitted a statement prepared by the Government's general accounting office showing all transportation charges paid by the Government over the period of 1928-1938, inclusive, of which 80 per cent went to the railroads. The statement disclosed that the freight charges paid increased from approximately $12,000,000 to about $48,000,000, or about 400 per cent. The big increase came after 1933 when the Government relief agencies were first established and which have taken over a large volume in traffic which under normal conditions would have been handled by commercial interests. Other Government agencies were specified as handlers of a large volume of materials, steel, cement, agricultural products, etc., in Government bills of lading. Among those named were PWA, WPA, AAA, Federal Surplus Relief Corp. and others.

At the time the land grant acts were passed, Mr. Nash said, it is obvious from the discussions in Congress that the reduced rates were expected to be applied to persons and freight of the military department of the Government and the United States mail. He said the railroads are firmly convinced that Congress in passing the land grant acts could not possibly have foreseen the development of Government activities as they are today. The view was expressed that at that time Congress had in mind only the business which would have been done by normal governmental activities and the desirability of developing trans-continental railroads from a military standpoint.

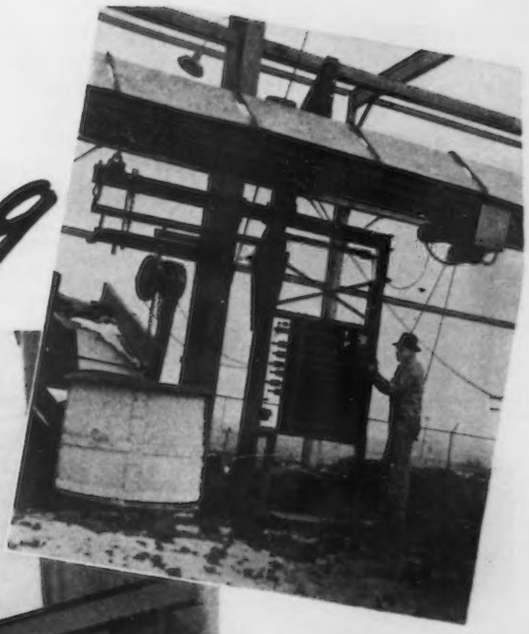
"We believe," Mr. Nash said, "that the continuation of the present application of the land grant acts is unfair and forces the railroads to contribute more than their share of expenses of running the Government."

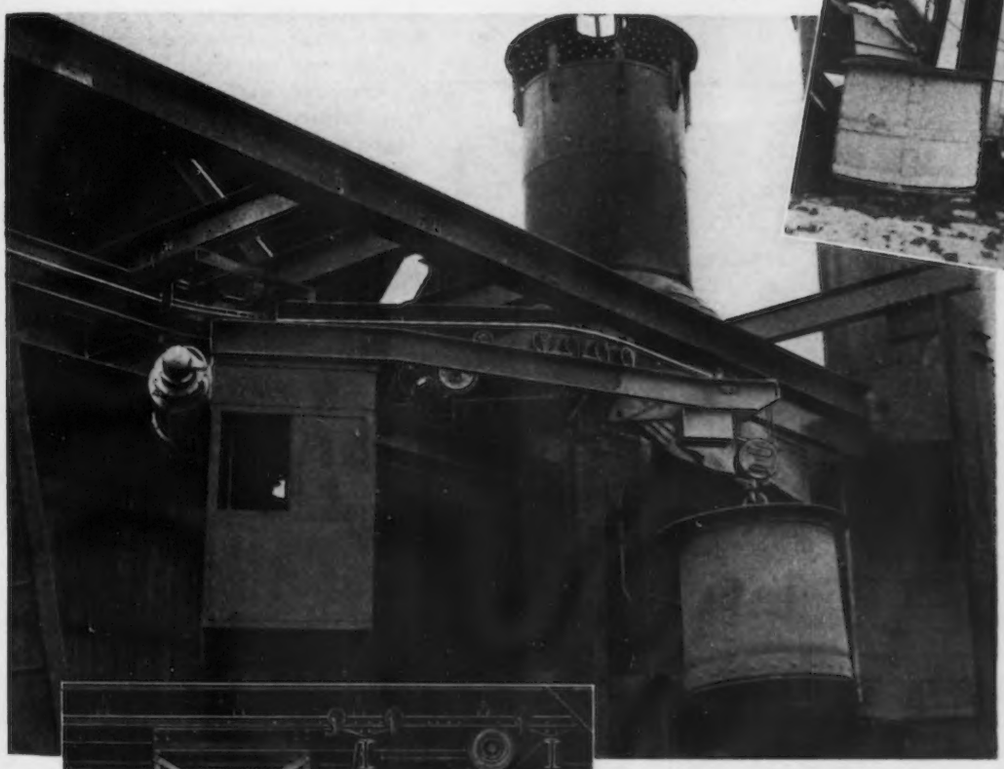
To indicate how the Government has extended use of land grant rates, Mr. Nash pointed out that other railroads than those receiving land grants have agreed with the Government to participate in the traffic moving between points where the land grant is effective, protecting the rates which have been completed over the land grant routes. It was also shown that, in order to reap full advantage of land grant rates, the Government often ships over absurdly circuitous routes as contrasted with direct routes over which commercial shipments are moved. No mention was made of the fact that this Government practice is identical in principle, but on a wider scale, with cross-hauling about which some of its organizations complain in attacking the steel basing point system.

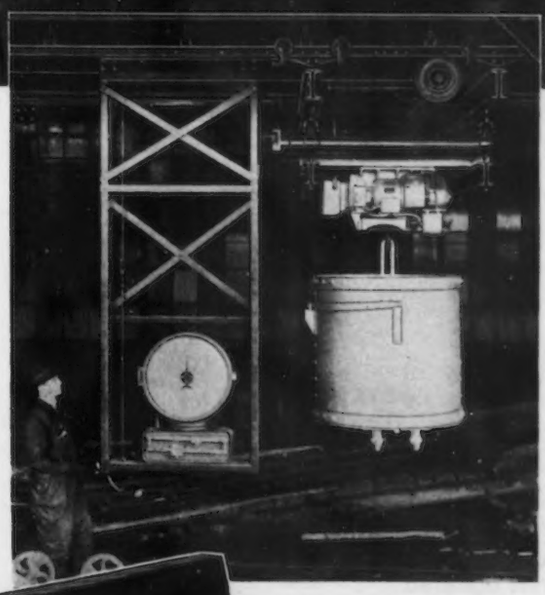
Steel Order Illustration

Complaining of the unfairness of the Government in accepting bids for material f.o.b. destination, charging the seller the commercial rate and then moving the shipment on a Government bill of lading, Mr. Nash referred to a case involving a large movement of steel from Chicago to Tulsa and Oklahoma City, Okla. He said a company at Tulsa contracted with the Government for fabricated jobs at the

Mechanical *Cupola Charging*







ABOVE—Traveling scale carrier delivers accurate charge to cupola at half the former cost.

CENTER—Cupola charger lowers bottom-dump bucket to deposit material in uniform layers.

LOWER—Traveling crane type carrier assures accurate weight and careful handling of charge.

Scientific foundry practice demands control of all materials in the charge. And profits are determined by the cost of handling these materials. Both can be obtained today by mechanical charging.

With scale units controlling the weight of materials on the carrier, half the handling labor can be turned to more productive use. Buckets arrive at the charger in faster intervals for careful lowering and uniform changing to insure equal distribution of heat.

Reports indicate that such methods result in greater plant capacity without further expansion; improved practice throughout the foundry; lower costs with increased opportunity for profits.

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two Oklahoma towns. The steel was purchased f. o. b. Tulsa but the Government moved it on a Government bill of lading. The Tulsa fabricator, Mr. Nash said, reported that in its invoices, the Treasury Department deducted the full commercial rate, though the railroad originally rendered the bills on the basis of land grant rates. Subsequently the Western Weighing and Inspection Bureau discovered the shipments had been purchased by the fabricator f.o.b. Tulsa. The railroad then rendered bills against the Government amounting to $5,755.36, based upon charging the commercial rate. Mr. Nash said this seemed to be unfair to either the seller or the railroad.

Discrimination Seen

"If the Government is going to charge the seller up to the full commercial rate it does not seem proper that they should force the railroad to handle on the basis of land grant rates," he stated. "We have been handling this matter with the Procurement Division, which has promised to give it further consideration. Of course if the land grant acts are repealed this dispute will be out of the way."

The present application of the law, Mr. Nash said, creates unjust discriminatory conditions as between producers and shippers, giving shippers located on land grant railroads an advantage over those located on non-land grant railroads in selling their products to an extent where it frequently is impossible to overcome. Mr. Nash said several specific cases had been brought to the attention of the association where the land grant situation had served to destroy competitive conditions.

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Government Orders For Week $363,795

WASHINGTON — Government contracts for iron and steel products, as reported by the Labor Department's Public Contracts Division for the week ended June 3, totaled $363,795. Reported for the same period were contracts amounting to $166,432 for non-ferrous metals and alloys; and $923,110 for machinery. Details follow:

Iron and Steel Products	
Messinger Bearings, Inc., Philadelphia, paths, roller steel	$58,828.00
Warren Foundry & Pipe Corp., New York City, cast iron water pipe	23,362.56
J. B. Slattery & Brothers, Inc., Brooklyn, gas ranges and gas hot plates	67,971.00
Welbilt Appliance Corp., Maspeth, Long Island, gas ranges	56,713.25
American Bridge Co., Denver and Gary, Ind., cast-iron pier plates.	70,245.00
Bethlehem Steel Export Corp., New York City, structural steel	24,656.41
Stupp Bros. Bridge & Iron Co., St. Louis, Mo., steel for bridge	62,019.40
Non-Ferrous Metals and Alloys	
International Minerals & Metals Corp., New York City, copper	$154,596.00
Baker & Co., Inc., Newark, gold casting, solder	11,836.00
Machinery	
Ingersoll Rand Co., Painted Post, N. Y., air compressors	$13,209.16
Caterpillar Tractor Co., Peoria, Ill., tractors	12,904.00
Marmon Herrington Co., Inc., Indianapolis, Ind., tractors	24,725.00
Pratt & Whitney, Division Niles-Bement-Pond Co., Hartford, Conn., drilling machines	24,900.00
The Cincinnati Shaper Co., Cincinnati, shear, squaring	13,789.00
Lloyd & Arms, Inc., Philadelphia, drills, radial	13,235.00
Lehman Machine Co., St. Louis, lathe, engine	11,640.00
Austin-Hastings Co., Inc., Cambridge, Mass., planer	19,860.00
Brown & Sharpe Mfg. Co., Providence, R. I., milling machines	19,909.76
Harnischfeger Corp., Milwaukee, Wis., power shovel	12,205.00
University Plumbing & Heating Co., Seattle, pumping plant	254,700.00
Silent Hoist Winch & Crane Co., Brooklyn, N. Y., capstans	38,738.00
Harnischfeger Corp., Milwaukee, Wis., traveling cranes	348,212.00
McKiernan-Terry Corp., Harrison, N. J., hammerhead crane	64,725.50

ICC Reorganizes to End Delays And Handle Omnibus Law Work

WASHINGTON—Looking to more prompt and efficient work, the Interstate Commerce Commission last week announced revision of its administrative organization by which Commissioner Joseph B. Eastman was elected chairman for a three-year period, effective July 1. The number of divisions was reduced from seven to five and the number of standing committees from 11 to two. Under the rearrangement functional duties will be more closely assigned and greater authority given to individual commissioners and the tenure of office for the chairman marks a departure from past policy of rotating the chairmanship from year to year. Mr. Eastman will succeed Marion M. Caskie, who voluntarily curtailed his own service by six months and refused to be considered for the enlarged term.

The reorganization is expected to allay criticism of the slowness of the commission's work and also to prepare it better for new duties that will fall upon it by the omnibus transportation bill which recently passed the Senate and is now before the House Committee on Interstate and Foreign Commerce. Further rearrangement of the work of the commission probably will be necessary upon the enactment of new legislation.

Among important changes made is provision for placing all rate matters in charge of two alternating divisions. Previously railroad rates were considered by one division while motor rates were considered by another.

The new divisions, their membership with its chairman the first named and duties follow:

Division 1, Administrative: Commissioners Eastman, Claude R. Porter and William E. Lee. General conduct of administrative matters not otherwise assigned or reserved; general supervision of the reports, records, and accounts of carriers; the discovery and enforcement of penalties for violations of law; the institution of investigations as to intrastate rates; personnel supervision and management; and the admission and regulation of practitioners before the commission.

Division 2, Rates, tariffs, and valuation: Commissioners Clyde B. Aitchison, Walter M. W. Splawn and Caskie. Long-and-short haul and provisions and related matters; valuation of the property of carriers, and the Standard Time Act. It will also have general supervision of informal complaints.

Division 3, Rates, service, and safety: Commissioners Charles Mahaffie, Carroll Miller and J. W. Alldredge. Safety appliance and related acts.

(Divisions 2 and 3 will alternate monthly in hearing arguments in cases within the general scope of the delegation of authority above indicated, and in all cases involving rates, fares, or charges, which have not been reserved to the commission itself or to some other division.)

Division 4, Finance: Commissioners Porter, Mahaffie and Miller.

Division 5, Motor Carrier: Commissioners Lee, John L. Rogers and Alldredge. Continues with general authority as to the Motor Carrier Act except with respect to rates and se-

"Give a Lift" every time your materials move ahead

This operation is preceded by one in which an Elwell-Parker *Fork* Truck delivers special containers of coiled wire from boxcars, and tiers them high in warehouse racks shown in background. When taken from storage, coils are reloaded and hauled on dollies by *Lift* Truck, used, among other purposes, as a tractor.

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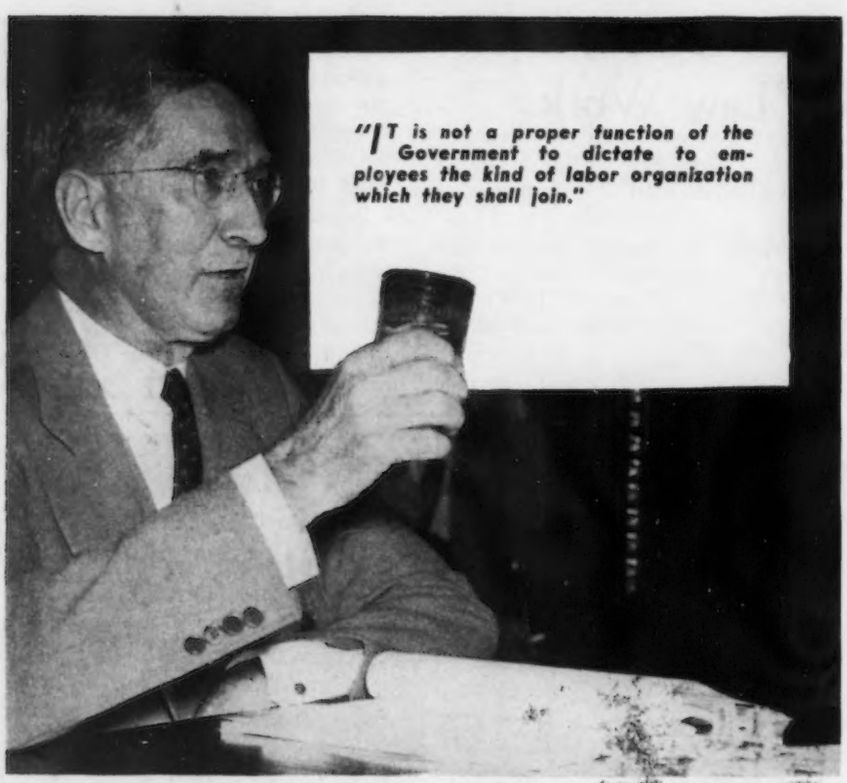

"IT is not a proper function of the Government to dictate to employees the kind of labor organization which they shall join."

SHOWN here is Walter S. Tower, executive secretary of the American Iron and Steel Institute, as (last week) he told the Senate Labor Committee that the steel industry favors, not emasculation of the Wagner Act, but amendments which would protect the rights of employees to work, prevent compulsory dues and monopolies by national labor organizations, give employers the right of free speech, and promote industrial peace.

curities, and the approval of consolidations, mergers, purchases of motor carriers, formulation of accounts, and enforcement of penalties, which have been transferred to other divisions.

Applications for rehearing of the action of any division will hereafter be given primary consideration by the division, so that if granted, commission consideration will not be necessary.

The legislative committee is made up of Commissioners Eastman, Mahaffie and Splawn. The committee on rules and reports is composed of Commissioners Aitchison, Porter and Mahaffie.

Farm Machinery Exports Decline

WASHINGTON — The Commerce Department's Machinery Division reports that exports of agricultural machinery and implements during April, valued at $7,067,114, were 17 per cent below the corresponding figure for April, 1938. Noting reduced shipments in all five major groups, the department reports that the smallest decline, amounting to 7 per cent, took place in exports of tractors and parts which comprised 78 per cent of the total farm equipment trade during the month.

Machinery for 66 Ships Will Cost $85,204,200

WASHINGTON—Unofficial estimates based on figures supplied by the Maritime Commission show that more than $85,204,200 will have been spent for machinery when the 66 ships now under construction as a result of the commission's assistance are fully completed. Total cost of the ships is $170,408,400.

For the agency's contemplated 10-year program, involving the construction of 500 ships costing approximately $1,250,000,000, over half that amount, or more than $625,000,000 will be spent for machinery. Estimates made by the Commerce Department's Machinery Division, indicating that the faster the ships the greater the amount expended for machinery, show that the proportion of a vessel's cost going into machinery ranges from 33 1/3 per cent for ships of 10 knots up to 51 per cent on ships of 16 knots.

War Department Contracts Announced

WASHINGTON—The War Department last week announced awards totaling $1,494,112 for aircraft equipment for the Air Corps and contracts aggregating $227,402 under the Ordnance Department's special machinery, inspection gage and ammunition programs. Firms receiving contracts under the special machinery program:

Ex-Cell-O Corp., Detroit, thread grinder and center-lapping machine $11,996 and $779 respectively; Cincinnati Milling Machines & Cincinnati Grinders, Inc., Cincinnati, automatic milling machines, $33,938, small automatic milling machines, $11,096; Brown & Sharpe Mfg. Co., Providence, R. I., automatic milling machines, $27,842, small automatic milling machines, $13,204, plain automatic milling machines, $8737, and one plain cylindrical grinding machine, $3655; Leland-Gifford Co., Worcester, Mass., hole drilling machinery, $2096, light high-speed drilling machine, $647, single spindle high-speed drill press, $647, and power feed attachments, $1520.

Stedfast & Roulston, Inc., Boston, multiple machining unit, $7296, one multiple spindle drilling, milling and tapping machine, $9385; H. R. Krueger & Co., Detroit, broaching machine and equipment, $13,041; Colonial Broach Co., Detroit, double ram, vertical surface broaching machine, $18,708; Thompson-Gibb Electric Welding Co., Lynn, Mass., heating and bending machine, $2200.

Norton Co., Worcester, Mass., surface grinder, $1560; Billings & Spencer Corp., Hartford, Conn., lot of forging and trimming dies, $361; Greenwood Arbor Press, Nashua, N. H., one hydraulic press, $786; B. Jahn Mfg. Co., New Britain, Conn., burring machine, $16,550, and one lot of tools and dies, $13,076; Triplex Machine Tool Corp., New York City, speed lathes, $860.

Awarded under the inspection gage program was a $3089 contract to the Wesson Co., Detroit, for machine gun gages. Companies receiving contracts under the aircraft program:

Curtiss-Wright Corp., Buffalo, spare parts and material for modification of aircraft, $1,117,811; The Ryan Aeronautical Co., San Diego, Cal., primary training airplanes, $6380; St. Louis (Mo.) Aircraft Corp., primary training airplanes, $10,663; Waco Aircraft Co., Troy, Ohio, primary training

airplanes, $7175; United Aircraft Corp., Pratt & Whitney Division, East Hartford, Conn., airplane engines, $164,062.

The Navy Department's Bureau of Yards and Docks last week awarded contracts to these companies:

Lidgerwood Mfg. Co., Elizabeth, N. J., steering gear and spares, $45,000; National Tube Co., Pittsburgh, steel flasks, $11,845.70; Manning Maxwell & Moore, Inc., Bridgeport, Conn., relief valves and spare parts, tools and wrenches, $13,739.54; W. E. Shipley Machinery Co., Philadelphia, surface grinder, $7,364; United States Pipe & Foundry Co., Philadelphia, cast iron water pipe, $16,643.28; Hayes Industries, Inc., Jackson, Mich., brakes and land gear, $9360; and Orton Crane & Shovel Co., Chicago, automatic type crane, $7414.

Reduction in Tin Can Sizes Is Approved

WASHINGTON—The board of the National Canners' Association has made formal request of the National Bureau of Standards to revise its simplified practice recommendation for the canning industry by adopting a separate list of can sizes for each of 58 different products which was recommended by the association's Committee on Simplification of Containers. In announcing the action taken by the board, Carlos Campbell, director of the Division of Statistics of the association, last week told the bureau's conference on weights and measures that the 58 fruits and vegetables included in the program, the result of a survey the bureau made in cooperation with the association, were so classified as to coyer the principal fruits and vegetables packed in the industry. He said the total pack of the 58 products amounted to about 97 per cent of the total pack of all fruits and vegetables in 1937. Inclusion of the remaining 3 per cent is contemplated as soon as possible.

The 58 lists of can sizes recommended include 45 sizes in the aggregate, a reduction from 155 sizes used in 1937.

"Each of 27 sizes was recommended for one product only, thus emphasizing the peculiar requirements of individual products," said Mr. Campbell. "Eighteen sizes were recommended for more than one product. The output of products in 1937 for which these 18 sizes were recommended totaled about 90 per cent of the total pack of fruits and vegetables. Thus, only seven per cent of the total pack will be permitted to use sizes not included in the list of 18 sizes."

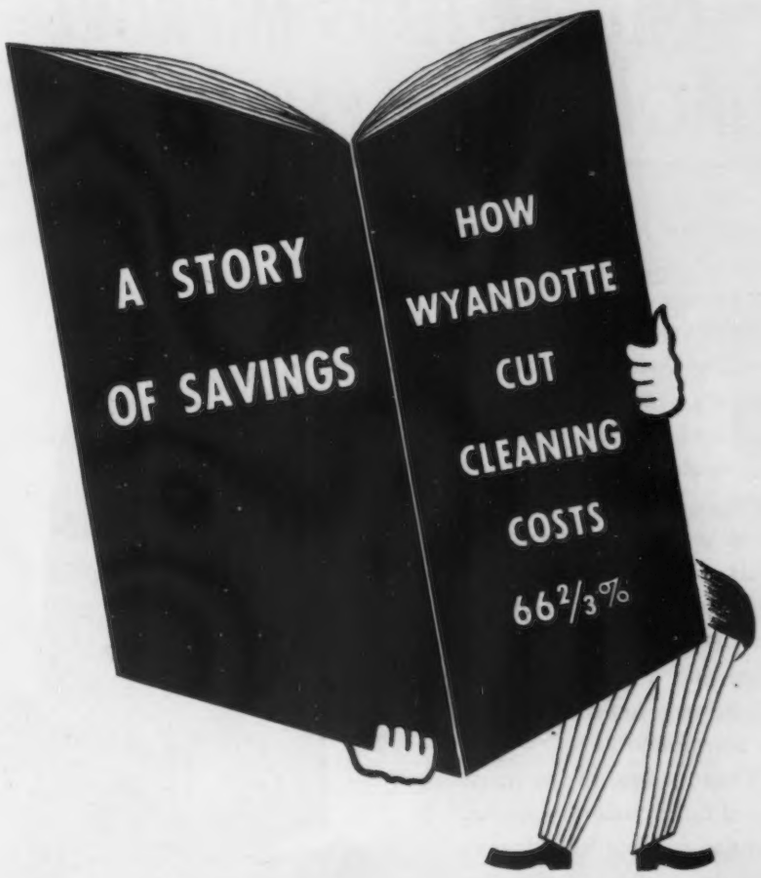
Sizes recommended are:

Tomatoes, four; peas and corn (not including corn on the cob), six each; asparagus and tomato juice, 10 each; beans with pork or sauce, eight.

The committee also recommended that as an original container, the can must be adapted in size and shape to the product for which it is used.

The National-American Wholesale Grocers' Association announced that it endorsed the views of the National Canners' Association.

International Filter Co. on June 2 moved its administrative and sales offices from Chicago's loop district to the company's factory at 325 W. 25th Place, Chicago. The main plant building's third floor has been remodeled to accommodate the executive offices and sales, advertising, accounting, laboratory, stenographic, file and mail departments.



FOR YEARS a large manufacturer of automotive hardware had used a Solvent Vapor Degreaser to clean steel stampings before zinc plating. The Degreaser operation was expensive and not always satisfactory.

Under a Wyandotte Service Man's supervision the Degreasing equipment was rebuilt to a steam coil heated alkaline solution tank. The solvent was taken out and a Wyandotte metal cleaner solution was substituted.

From 8500 to 10,000 pounds of steel stampings are cleaned in this plant daily. Using the old chlorinated solvent method, the cost was about $3 per day, or $.705 per ton of stampings cleaned. Under the new Wyandotte method, the cost has been reduced to $1 per day, or $.236 per ton.

***This means a saving of 66⅔%*, with absolutely no deterioration of equipment and eliminating the frequent boiling out of equipment with soda ash. It paid this company to get in touch with *their* Wyandotte man. Why not call *your* Wyandotte Service Representative today?**

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Senate Clears Way for Low Cost Housing Program in Farm Areas

WASHINGTON — The United States Housing Authority, which after two years has sold only about $100,000,000 of an authorized $800,000,000 worth of bonds and has yet to complete one of its low-cost housing projects, would be given broadened authority to inaugurate a program in rural areas under a bill which passed the Senate last Thursday by a vote of 48 to 16.

The measure, which would double the USHA's bonding authorization, permitting it to loan $800,000,000 for additional projects and to raise its rent subsidy payments from $24,000,000 to $70,000,000, was passed over the protest of a few members of the Senate who insisted that the law had fallen short of accomplishing its avowed purpose, and that private industry could build housing facilities just as cheaply as the Government. The expanded authority, empowering the agency to design a program for families of low income in rural areas, also authorized it to use for the purpose any proportion of the new capital it may desire.

The bill is generally expected to pass the House where the preponderance of members representing rural areas will now look with favor upon the measure.

Senator Taft, Republican of Ohio, who insisted that "a wise housing policy is essential to recovery" but implied that the USHA has been moving in circles, was defeated on his proposal to reduce the additional $800,000,000 to $400,000,000 and to subject all Government housing agencies to a Congressional investigation. Senator Walsh, Democrat of Massachusetts, charged that administration of the low-cost housing program thus far indicated that "high rents" would prevent the poorest from enjoying subsidized housing.

The agency to date has approved loan contracts totaling $409,698,000 under which the projects are being constructed. Two of these are expected to be completed within the next two months. In addition to the loan contracts for 181 projects, earmarkings outstanding aggregate $245,941,000.

When the law was passed two years ago it was the promise of Congressional and Administration sponsors that it was a necessary development to bring about a well-rounded recovery and that it would go far in stimulating the construction industry. The agency usually gives as the reasons for the delay in its activities the fact that legislatures of the various states first had to pass laws authorizing the creation of local housing authorities and that after these were passed it required considerable time to organize local corporations, prepare contracts and complete plans to meet the requirements specified in the law.

Meanwhile, some opposition was developing to the slum-clearance and low-cost housing amendments on the House side. Representative Dudley A. White, Republican of Ohio, attacked the present law as "manifestly unfair," charging (1) that rents are too high for slum dwellers even after subsidies; (2) that the Federal Government is required to contribute $3,000,000 for every $1,000,000 of con-

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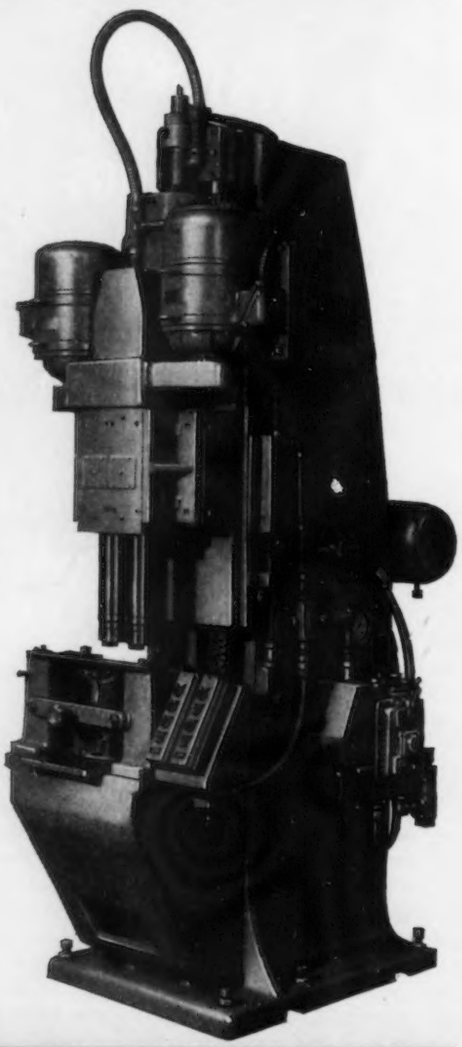
These advantages grow out of fluid power of course; but the number and degree of them are a function of the Oilgear design, construction and principle of operation alone. To make *your* machine more salable and more profitable, get in touch with Oilgear engineers or write for literature. THE OILGEAR COMPANY, 1311 W. Bruce St., Milwaukee, Wisconsin.



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struction; (3) that under the present high costs, the program already undertaken barely scratches the surface and indicate that the cost of meeting complete demands would be far beyond the most rosy visions of the Government resources; and (4) that the average citizen who lives in a $2,282 home obtained at his own expense is compelled under this program to supply $5,534 homes for others, with additional subsequent costs bringing the total to an average of $21,417 in final analysis.

Governor Lehman of New York has signed four bills starting that state on a $150,000,000 low-rent housing and slum-clearance program. The governor said that a sound, workable law has been written and that the purchase of building materials and the employment of thousands of men should serve to give a new stimulus to business.

The New York housing law authorizes the state to enter into agreements for loans to municipalities or Authorities not exceeding $150,000,000, of which not more than $50,000,000 may actually be lent during the next year. It likewise empowers the state to enter into agreements for subsidies not exceeding $1,000,000 a year.

NLRB Decides Against Three More Firms

WASHINGTON—The National Labor Relations Board last week issued orders against the Art Metal Construction Co., of Jamestown, N. Y., requiring it to bargain upon request with the AFL's International Association of Machinists as the exclusive bargaining representative of production and maintenance employees; against the Pennsylvania Furnace & Iron Co., of Warren, Pa., directing it to bargain with the AFL's machinists' union; and against the Clark Equipment Co., of Battle Creek, Mich., requiring it to disband an employees association, to invalidate any agreement the company may have with the association, and to discontinue the alleged practice of discouraging membership in the AFL's machinists' union.

The NLRB also certified the CIO's electrical and machine workers' union as the collective bargaining group for hourly paid employees of the Ohio Brass Co., Barberton, Ohio, and scheduled collective bargaining elections at the Derry, Pa., plant of Westinghouse Electric & Mfg. Co., and at the Alcoa, Tenn., works of the Aluminum Company of America. The collective bargaining election fixed for Aluminum Company employees will be the fourth to be conducted by the Board.

$100,000,000 Stock Pile Bill Signed by President

WASHINGTON — President Roosevelt last week affixed his signature to the stock pile bill which authorizes an expenditure of $100,000,000 during the years 1939-1943 for purchase of such strategic and critical materials as manganese, chromium, tin and nickel. Mr. Roosevelt urged Congress several months ago to limit the authorization to $40,000,000 over the four-year period but the House boosted the amount to $100,000,000 and the Senate subsequently concurred. Budget estimates indicate, however, that only $10,000,000 will be spent in the next year. Among other things, the approved measure provides for:

1. Purchases to be made under the Buy American Act and a reasonable time, not exceeding one year, is allowed for delivery by domestic sources who will be permitted to bid without posting bond.

2. Joint action by the Secretaries of War, Navy and Interior in determin-

Complete Service...
FOR ALL USERS OF IRON AND STEEL
The past decade saw an era when "bigness" was the generally accepted evidence of quality and service. Andrews Steel preferred, however, to continue as a completely integrated organization so that a single management group could be in touch with and oversee every plant activity; to introduce new products and make such physical growth as to adequately meet the quality and service demands of the most exacting quantity buyers. Today Andrews Steel continues its new product development; and matches this development with a plant expansion program of increased facilities, to enable customers to enjoy even finer quality and higher standards of service.
Andrews extends the profitable advantages of complete service to all interested users, and welcomes the opportunity to work with them in the application of Andrews iron and steel to present or contemplated products.
ANDREWS STEEL

NEWPORT PRODUCTS: Hot Rolled Sheets • Cold Rolled Sheets • Newport Electrical Sheets • GOHI Pure Iron-Copper Alloy Sheets • Globe Brand Galvanized Steel Sheets • GOHI Enameling Iron Sheets • KCB Copper Steel Sheets • Newport Long Terne Sheets • Newport Galvannealed and DeLuxe Metal Sheets.

GLOBE PRODUCTS: Galvanized Iron and Steel Roofing and Formed Sheet Metal Building Materials.

THE ANDREWS STEEL CO.
NEWPORT, KENTUCKY
DIVISIONS
THE NEWPORT ROLLING MILL COMPANY
THE GLOBE IRON ROOFING & CORRUGATING CO.

ANDREWS PRODUCTS in Carbon and Alloy Steel: Blooms • Forging Billets • Re-rolling Billets • Slabs • Universal Mill Plates • Sheet Bars.

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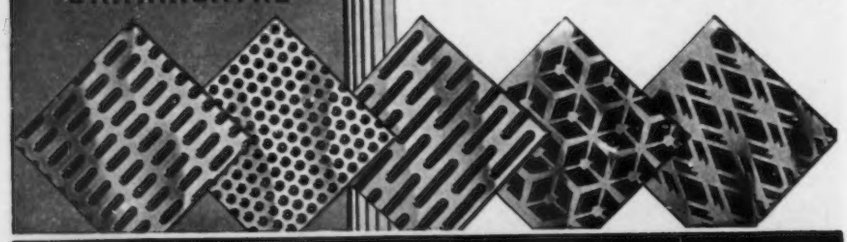

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Cunningham Safety Steel Type and Holders will give you more and better impressions than other marking devices. They are manufactured from the world's strongest commercially-made tool steel, and they're immune from mushrooming and spalling.

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Write for Illustrated Literature

Hand Model

Sledge Model

M. E. CUNNINGHAM COMPANY

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ing qualities and quantities of materials to be purchased.

3. Materials to be used only in time of war or when a national emergency exists, the Secretary of the Treasury to report annually on expenditures and methods used for rotation of materials to prevent deterioration.

New Deal "Glorifies Failure"—L. du Pont

LAMONT DU PONT, president of E. I. du Pont de Nemours & Co., in an address at Pittsburgh, told members of the National Association of Manufacturers that the bars to recovery are exhorbitant spending, excessive and unfair taxes, ill-conceived laws, a prejudicial attitude of Government toward business, and the stifling of private enterprise.

Removal of these bars, said Mr. du Pont, will not occur until "the people see the full truth and give their support to those men in public affairs who already see it.

"The nation's business structure has been made the plaything of theorists, regulated, restricted and abused, precisely at the time when it was fighting for its life in a world-wide depression of greater severity than ever experienced before," he said. "And at the same time the savings, which are the life-blood of all business progress, have been diverted into channels which are the antithesis of progress, and a government dedicated to glorifying failure has been built on the sands thus irrigated."

Germany Takes More U. S. Non-Ferrous Metals

WASHINGTON—Despite a general decline in trade relations with Germany, United States exporters of non-ferrous metals have expanding markedly their trade in the Reich during the past three years. Reports to the Commerce Department indicate that imports of non-ferrous metals from the United States increased from a value of $9,880,000 in 1936 to $32,177,200 in 1938.

The reports, which said that especially sharp gains were recorded in imports of copper, brass, and lead, noted that this country's share in Germany's import trade in ores and metals had increased from 8.9 per cent in 1936 to 16.8 per cent in 1938.

Statistically Speaking:

May Construction Highest Since 1930 . . . Coal Output Declines

HEAVY engineering construction in May showed a continuation of the upward trend that has been evident for the past several months, according to reports compiled by *Engineering News-Record*. Total contracts awarded in May amount to $252,992,000, the highest for any May since 1930 and the largest total for any month this year, except January. In April awards were $240,735,000, while in May, a year ago, the figure was $183,806,000. Private construction in May rose 10.5 per cent over April, as against a 3 per cent gain in public building. Awards in the first five months of the present year amount to $1,294,829,000, a 25.5 per cent increase over the corresponding period of 1938 and the highest five-month total since 1930.

Preliminary figures on May production of Pennsylvania anthracite, issued by the Bureau of Mines, show a daily output of 195,000 net tons as compared with 220,700 in April and 170,200 in May, 1938. Total output for the three months was respectively 5,071,000, 5,296,000 and 4,255,000 tons.

Both shipments and production of domestic slab zinc in May were off slightly. The former 1304 tons and the latter 734 tons. May shipments, however, at 39,607 tons, were still substantially above the 1938 average of 32,963 tons. Total reserves at the end of the month were 133,075 tons or about 3 1/3 months supply at the present rate of consumption. Domestic lead stocks on May 1 were 219,006 tons or about 5½ months supply.

Detroit Refuses Tax Cut To Help Hupp Production

AN appeal from the Hupp Motor Car Corp. for a $125,000 reduction in its $275,000 delinquent tax bill was turned down recently by a five to four vote in the Detroit City Council. The cut was asked by S. L. Davis, Hupp president, who said that with that amount of money the corporation could resume full production. The city assessors opposed this because it was in the nature of a subsidy.

Faster.

Foot operated valves simplify control, give increased production, and leave the operator's hands free for other work. Spring return model gives instant reversal of the cylinder upon release of the pedal, is especially adapted to operation of arbor presses, riveting presses, and similar air operated equipment. Hannifin disc-type valves have no packing—and no leakage or packing maintenance troubles. Write for Valve Bulletin 34-A, with complete listings of all types.

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HANNIFIN MANUFACTURING COMPANY
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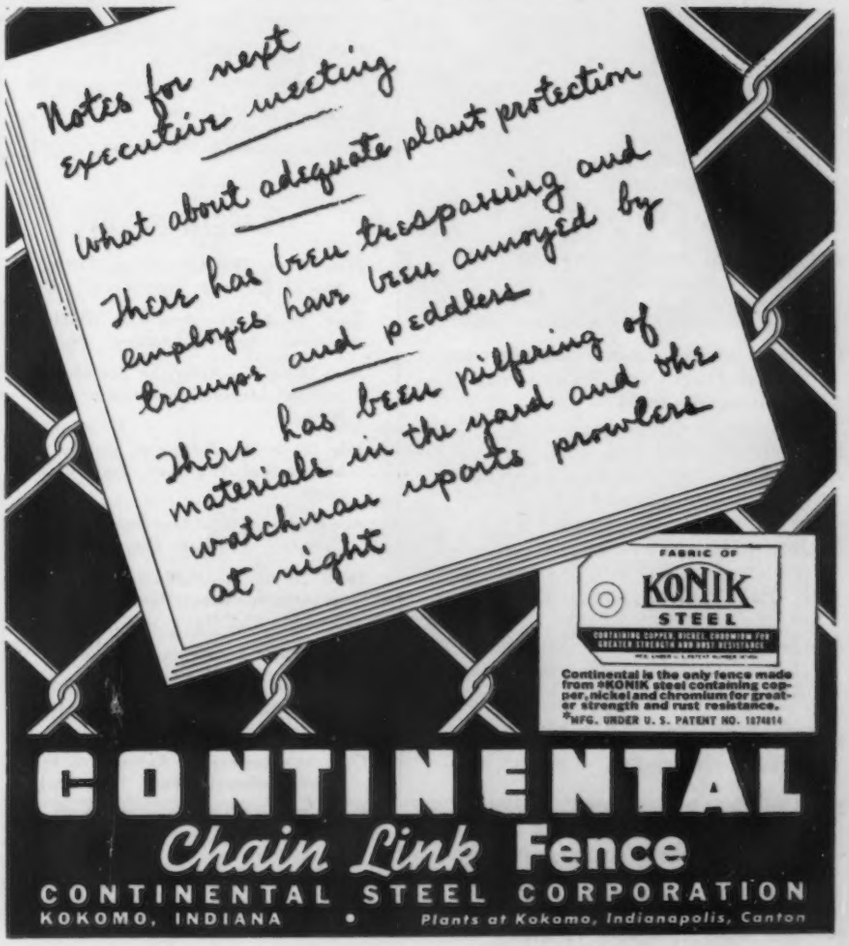
HANNIFIN "Packless" AIR CONTROL VALVES


Notes for next executive meeting
what about adequate plant protection
There has been trespassing and employes have been annoyed by tramps and peddlers
There has been pilfering of materials in the yard and the watchman reports prowlers at night
FABRIC OF
KONIK
STEEL
Continental is the only fence made from *KONIK steel containing copper, nickel and chromium for greater strength and rust resistance.
*MFG. UNDER U. S. PATENT NO. 1674614

CONTINENTAL
Chain Link Fence
CONTINENTAL STEEL CORPORATION
KOKOMO, INDIANA • Plants at Kokomo, Indianapolis, Canton

. . . THE NEWS IN BRIEF . . .

Automobile output rises after settlement of Briggs strike. Buying activity in steel and other products shows little change, however, as new model season approaches. —**Page 50.**

Railroads protest Government abuse of carriers' land grant rates.—**Page 54.**

Government steel orders for latest reported week total $363,795.—**Page 56.**

ICC reorganizes to end delays and handle new omnibus law work—**Page 57.**

Machinery in Maritime Commission's 66 ships to cost $85,204,200.—**Page 58.**

War Department awards aircraft equipment contracts valued at $1,494,112.—**Page 58.**

U. S. farm machinery exports in April 17 per cent under a year ago.—**Page 58.**

Canners' Association approves reduction in number of tin can sizes.—**Page 61.**

Senate clears way for low-cost housing program in farm areas.—**Page 62.**

$100,000,000 strategic materials stock pile bill signed by President.—**Page 63.**

Labor Board hands down collective bargaining decisions against three more employers.—**Page 63.**

Germany takes more non-ferrous metals from U. S., despite general decline.—**Page 64.**

Lammont du Pont lists spending, bad laws, heavy taxes among obstacles to recovery—**Page 64.**

Detroit refuses to cut tax delinquency to permit full production by Hupp. —**Page 65.**

Apollo Steel Co. employees support SWOC by 436 to 275 votes.—**Page 69.**

Machine Tool Dealers meet at Schenectady.—**Page 69A.**

Steel industry is seeking a remedy for bad selling practices in sheets. Putting prices on a spot basis suggested as one way.—**Page 69D.**

British need more scrap than mills can afford.—**Page 69G.**

Pipe award to French company is held up by Detroit Water Commission. —**Page 69G.**

Carnegie-Illinois Steel Corp. sells Cambridge, Ohio, plant; property subdivided.—**Page 70.**

New or modernized facilities replace old steel mills.—**Page 70.**

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MEETINGS

June 18 to 22—Advertising Federation of America, New York.

June 19 to 22—American Electroplaters' Society, Asbury, N. J.

June 26 to 30—American Society for Testing Materials, Atlantic City, N. J.

July 10 to 15—American Society of Mechanical Engineers, San Francisco.

Aug. 28 to 31—American Mining Congress, Salt Lake City.

Sept. 20 to 22—National Industrial Advertisers Association, New York.

Sept. 26 to 29—Association of Iron and Steel Engineers, Pittsburgh.

Oct. 5 to 7—Society of Automotive Engineers, aircraft production meeting, Los Angeles.

Oct. 16—Society of Automotive Engineers, annual dinner, New York.

Oct. 23 to 27—National Metal Congress, Chicago.

Pittsburgh Steel Foundry Corp. strike, called March 2, is settled.—**Page 71.**

International Harvester Co. denies NLRB charges of unfair labor practices.—**Page 71.**

Bethlehem Steel Co. will issue $25,000,000 in bonds.—**Page 71.**

State of Michigan seeks expert advice of industry's purchasing agents.—**Page 72.**

Honing Equipment Corp. is organized by J. A. Carlin at Detroit.—**Page 72.**

Knudsen award for industrial medicine contribution goes to Dr. C. O. Sappington—**Page 72.**

Micromatic Hone Corp., Detroit, reports heaviest backlog in its history.—**Page 72.**

T.C.I. ordered to pay miners $390,000 for time lost during coal strike.—**Page 72.**

Union Carbide & Carbon Co. units open new Cleveland district offices. —**Page 73.**

Gear sales in May showed 6 per cent increase above April.—**Page 73.**

April steel imports to U. S. 41,314 tons against 24,589 tons in March.—**Page 73.**

Railroad equipment orders so far in 1939 increase 50 per cent.—**Page 75.**

U. S. Steel Corp. finished steel shipments in May 723,165 tons compared with 701,459 tons in April. —**Page 75.**

Steel for household goods off in 1938. —**Page 94.**

Taxes topped fuel costs for railroads in 1938.—**Page 94.**

Machine tool index soars to 219.8 in May from 155.6 in April.

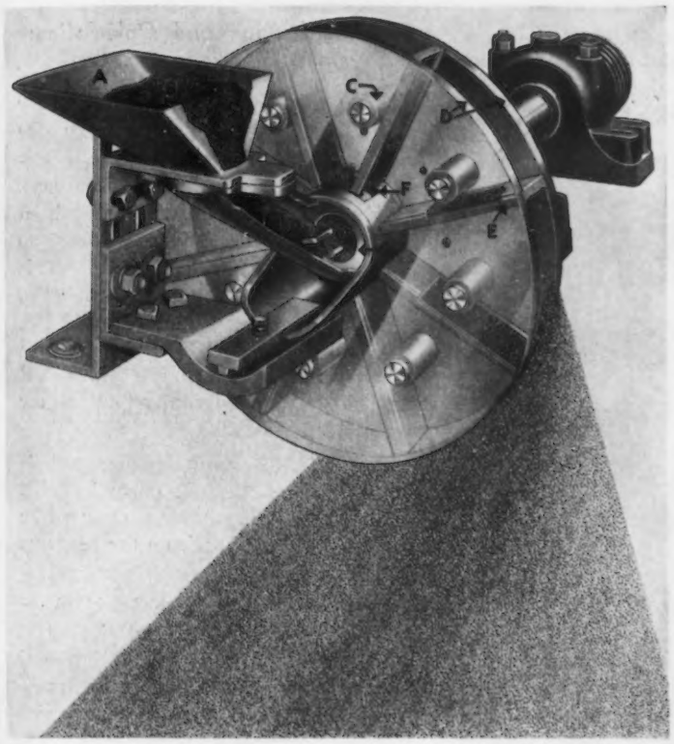
Heppenstall Co. signs contract with John L. Lewis' SWOC.

C. S. Stilwell sees future threat to U. S. trade in British plant expansion.

Labor Board stages publicity campaign to "smear" Armco, witness says.

INSEPARABLE

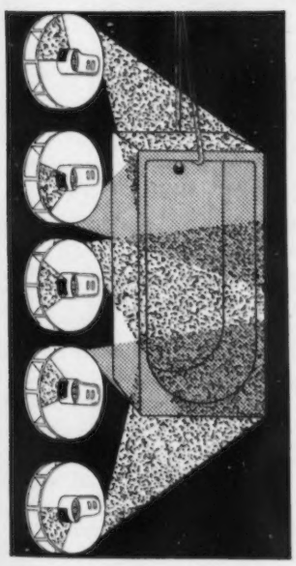
CENTRIFUGAL BLASTING and Perfected DIRECTIONAL CONTROL



Reliable directional control is obtainable only in the time-proved and exclusive features of American WHEELABRATOR.

Note that American directional control is attained at the center of the WHEELABRATOR. Abrasive discharged through the stationary control cage is picked up by the inner ends of the throwing blades and is gradually accelerated in its passage to the periphery of the wheel. The final throwing velocity is the resultant of radial and tangential forces. This means that the blast utilizes all of the power supplied to the WHEELABRATOR. The WHEELABRATOR will throw more abrasive — and throw it harder — per horsepower expended, than any other blasting device ever conceived.

Nearly 700 WHEELABRATORS the world over testify to the soundness of WHEELABRATOR directional control.



How perfected directional control of abrasive, in the biggest monorail blast machine yet built, enables American to clean bathtub castings with fewer wheels and at higher speed than ever before.

KEY TO WHEELABRATOR PARTS

(Shown in Phantom View Above)

(A) ABRASIVE FUNNEL

(B) ABRASIVE (Metallic Shot or Grit)

(C) SPACERS BETWEEN SIDE PLATES

(D) SPECIAL STEEL SIDE PLATES

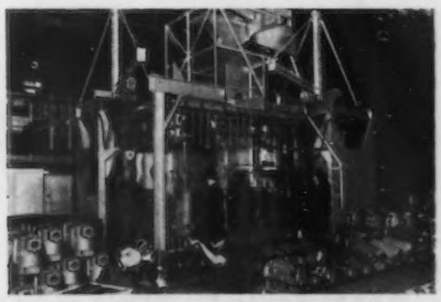
(E) CAST ALLOY BLADES (Removable)

(F) CAST ALLOY CONTROL CAGE (Stationary in Operation.) Change in direction of abrasive blast can be obtained by turning control cage, which changes the position of the opening.

(G) CAST ALLOY IMPELLER (Rotates With Wheel.) This unit carries the abrasive to the opening in the control cage where it discharges to the bladed section of the wheel.

Above: Drawing showing how the abrasive blast from a WHEELABRATOR completely covers the load in a Tum-Blast machine.

View of WHEELABRATOR Unit and Drive Mechanism.



A WHEELABRATOR Special Cabinet Used by a Large Mid-Western Manufacturer for Cleaning Truck and Tractor Cylinder Blocks.

THE American FOUNDRY EQUIPMENT CO.
510 S. BYRKIT ST. MISHAWAKA, IND.

Perchloric Acid

(CONTINUED FROM PAGE 35)

for fear of loss of ammonia. Then slowly add more of the 60 per cent NaOH until the mixtures in the Kjeldahls are just alkaline to litmus paper. Then add an excess of 25 ml. NaOH and no more.

Place enough 0.01 normal solution of the H_2SO_4 standard in the 500 ml. Erlenmeyer receiving flasks to have a minimum excess of about 10 ml. of this standard acid after the distillation has been completed. When the distillation is finished, titrate the liquid in the receiving flasks with 0.01 normal solution of NaOH to a slight pink, using sodium alizarine sulphonate solution for an indicator (0.25 gm. in 25 ml. H_2O).

The solutions used in all the foregoing nitrogen determination are as follows: 60 per cent NaOH 600 gm. NaOH purified flake diluted to 1000 ml. with H_2O. 0.01 normal H_2SO_4 standard—100 ml. of stock solution diluted to 1000 ml. with H_2O. Stock H_2SO_4 — 8.2 ml. of the 1.835 spg. C.P. grade diluted to three liters with H_2O. 0.01 normal NaOH standard — 0.85 gram C.P. NaOH diluted to two liters with H_2O.

Standardization and Calculations

Relation by titration: 10.2 ml. of H_2SO_4 equals 10.0 ml. NaHO; 100 mg. KCNS were put through the entire method; 110 ml. of the 0.01 normal H_2SO_4 were in the receiving flask. After the distillation, the 350 ml. of liquid in the flask were titrated to pink with the standard NaOH. This consumed 9.9 ml. of the NaOH. Then 9.9×1.02 (relation factor) $= 10.098$. Therefore, the 10.098 represents the unused portion of the 110 ml. of 0.01 normal H_2SO_4 originally put in the receiving flask.

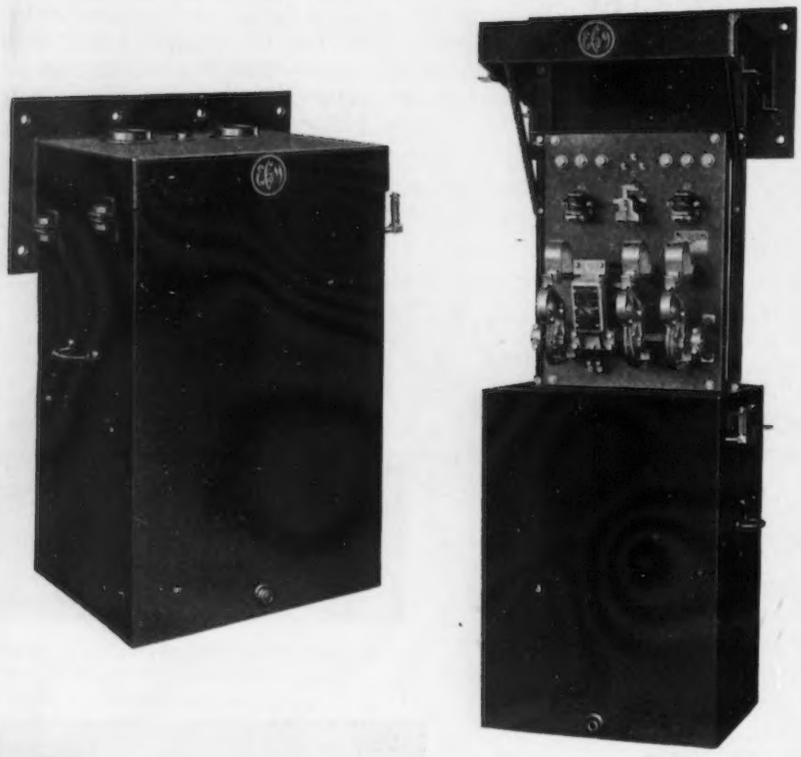
A blank determination was made into 10 ml. of the 0.01 normal H_2SO_4 and 2.3 ml. of the latter were used by the NH_4OH coming from the reagents and atmosphere.

Add the 10.098 to the 2.3 blank = 12.4 ml. Hence 110.0 ml. less 12.4 equal 97.6 ml. 0.01 normal H_2SO_4 used by the NH_4OH coming from the nitrogen in the 100 ml. KCNS. Since there is 14.42 per cent nitrogen in KCNS, then 100 mg. KCNS $\times$ 0.1442 = 14.42 mg. nitrogen in the 100 mg. of KCNS. $14.42 \div 97.6 = 0.148$ mg. nitrogen per 1 ml. 0.01 normal H_2SO_4 used.

100 mg. of the coal sample were dissolved and then distilled over into 40 ml. of the 0.01 normal H_2SO_4. On titrating the liquid in the receiving flask the following data were secured: NaOH consumed 26.2×1.02 (relation) $= 26.7 + 2.3$ blank $= 29.0$ ml. 40 ml. of $H_2SO_4 - 29 = 11$ ml. net H_2SO_4 used by 100 mg. of coal. Then $0.000148 \times 11 \times 100 \div 0.100 = 1.628$ or 1.63 per cent nitrogen. The values in mg. nitrogen of the 0.01 normal H_2SO_4 were at all times in good agreement, whether 40 mg. or 100 mg. KCNS were put through to get the nitrogen factor as shown in table IV.

The results reported by the Park plant analysts in table IV were obtained by the foregoing method and reported without the operator's knowledge of the nitrogen content as gotten by the Department of the Interior. The time required to run one blank, two known amounts for factor and the sample in duplicate, including all operations, was 6½ hr.

EC&M STARTER for (CLASS 1, GROUP D) SERVICE



THIS illustration shows an EC&M Full Voltage, Oil-Immersed Starter of Class 1, Group D Construction for use with a 200 HP, 440 Volt motor, to be installed in a South American refinery. The start and stop Push Button station is an EC&M Bulletin 1105-A Push Button of Class 1, Group D Construction with air-break contacts. Lower half of push button case is tank which may be filled with oil to provide oil-immersed contacts, if desired.

As shown above, this Starter is arranged for wall-mounting, is of drop-tank construction and is equipped with oil-level gauge. Overload relays as well as the magnetic contactor for handling the main motor circuit are completely oil-immersed.

This attractive unit, well suited for oil refineries, grain elevators, pump houses, etc., is shown on EC&M Photograph 2168. Write today for a copy for your files.

THE ELECTRIC CONTROLLER & MFG. CO. CLEVELAND, OHIO

HEAVY DUTY MOTOR CONTROL FOR CRANES, MILL DRIVES AND MACHINERY • BRAKES • LIMIT STOPS • LIFTING MAGNETS AND AUTOMATIC WELD TIMERS.

Manufacture of Artillery Ammunition

(CONTINUED FROM PAGE 29)

for the copper rotating band yet to be applied.

Application of Rotating Band

The excess metal of the bourrelets, left on in the finish turn operations, is now removed by passage of the shell through a centerless grinder, which imparts a high degree of finish to the bourrelets so that the wear of the bands of the rifling within the barrel of the gun will be held to a minimum. Bands are next applied cold by means of a band seating machine. This machine, briefly, consists of a series of rams, carrying die heads, which move inwardly toward a common center. These rams are manifolded, so that each exerts an equal pressure. In order that the copper may have time to flow, each of the nine applications of power given in band seating is relatively brief in period of time. By using this technique, it has been found that the copper flows uniformly into the band seating scores and dovetails at the ends of the band seat, and that the elongation and tensile strength are maintained at the desired levels. To assure a true flight and to prevent tumbling, a projectile must be given spin. The rotating band, when the shell is fired, is engraved by the spiral rifling within the gun, thus imparting rotation to the shell proper. In some guns, this rotation may be as high as 26,000 r.p.m. High-speed lathes, such as shown in Fig. 5, now turn the rotating band to the required dimensions, and at the same setting the band is marked with the necessary information regarding lot number and type of shell.

Final Inspection

Rubber covered roller conveyors carry the shell to the wash tanks for thorough removal of all oil, grit and foreign substance. Final inspection, which is of such vital importance in maintaining quality, is now given. All dimensions, which must be maintained for successful accuracy, are checked. Every shell is weighed, to be assured that the exacting weight tolerance is met. The interior cavity is sprayed with acid-resisting paint, and the exterior, except the bourrelet surface, is sprayed with a quick-drying paint.

The shell are packed in boxes and stored until such time as shipping instructions are received. During this interval, the inspector has picked five shells at random from the lot, which are fired at the proving ground for accuracy of ranging. If the ranging specifications are met, the lot is shipped to the loading plant to receive its bursting charge of high explosive.

In this article the operations involved in the production of a typical artillery shell have been described. In a second article to follow, the manufacture of brass cartidge cases will be presented.

Apollo Steel Workers Back SWOC, 436 to 275

PITTSBURGH—Employees of the Apollo Steel Co. in an NLRB supervised election last week selected the SWOC as their collective bargaining agency by a vote of 436 in favor of the SWOC to 275 in favor of the Apollo Steel Employees' Protective Association, an independent organization. A total of 737 out of 837 eligible voters participated. Twenty-six voted against affiliating with either union.

Protect Your Workers with
MORTON'S SALT TABLETS

Heat-Fag and hot weather travel together. You can't stop the weather — but, you *can protect your workers against Heat-Fag* and stop the sag in the production line by placing Morton's Salt Tablets at every drinking fountain. These handy little tablets represent the easiest and most convenient way to replace the vitally needed body salt that's sweated out by hard work on hot days.

MORTON'S SALT TABLETS Dissolve in 50 Seconds

Workers find them easy to take with a drink of water. They dissolve quickly. Only the purest and most highly refined salt is used.

MORTON'S DISPENSER . . . Sanitary, Economical, Convenient

Install Morton's dispensers and salt tablets in your plant now. Get ready for the hot days ahead. Remember—a small investment now will protect the health and efficiency of your workers when Heat-Fag threatens your plant. Shipments will be made promptly — prepaid.

Write for folder—"Heat-Fag"

MORTON SALT COMPANY CHICAGO, ILLINOIS

MACHINE TOOL DEALERS

WITH 11 addresses and papers, an executive session, three plant inspection trips, a luncheon meeting, an informal banquet, and a golf tournament, the spring convention of the Associated Machine Tool Dealers of America, Inc., held June 5-6 at the Van Curler Hotel, Schenectady, N. Y., featured an unusually generous program.

Officials of the General Electric Co. participating in the program included E. D. Spicer, manager, Schenectady works, who made the address of welcome, R. C. Muir, vice-president in charge of engineering, who painted an interesting picture of Schenectady as a pioneer city and of G-E as a pioneer in the field of electricity, and J. E. N. Hume, commercial vice-president, industrial department. W. R. Burrows, vice-president in charge of manufacturing, was guest of honor at the luncheon meeting, June 6. On the afternoon of June 6, G-E was host to the association at its Schenectady works.

Although the program of papers and addresses was based primarily on the problems and opportunities of machine tool salesmen, it took in a number of discussions of basic conditions affecting the entire machine tool industry in both its production and selling functions. The latter included discussion of the recent attacks on modern machinery as creators of unemployment and the necessity for systematic educational efforts to provide leaders of public opinion and the general public with facts as to what a machine tool is, what it means to business in general, and what it means to society.

From Builder to Salesman to User

An outstanding address was the keynote message of A. G. Bryant, president, Bryant Machinery & Engineering Co., Chicago, and president of the dealers' association. The title of his address, "From Builder to Salesman to User," was an apt paraphrase of the famous slogan of baseball history, "From Tinker to Evers to Chance." The paraphrase was chosen, he said, because so much of loyalty, of skill and of downright teamwork was typified by the phrase from baseball history.

If ever an industry needed close teamwork and ability to match cooperation with skill, as in the case of the old baseball masters, it is the machine tool industry of today, he said. In these days when so many discordant elements are seeking purposely or inadvertently to jeopardize the foundations of this basic business, we need to rekindle a true spirit of cooperation and come to a closer realization of our individual responsibilities and opportunities.

OFFICERS of the Associated Machine Tool Dealers of America in front of G-E Research Laboratory, during the plant inspection trip, June 6. Left to right are: Vice-President John Sauer, Jr., Peninsular Machinery Co., Detroit; President A. G. Bryant, Bryant Machinery & Engineering Co., Chicago, and Thomas A. Fernley, Jr., Philadelphia.

GROUP of machine tool builders pausing in trip. Left to right are: G. J. Zimmerman, Co.; H. E. Oatis, National Supply Co.; G. F. McCarthy, Henry Prentis & Co.; James E. Gleason, Press Co.; and

The process of producing, marketing and using the master tools of industry is one that is utterly vital in present-day civilization. The more light that is thrown upon the wailings of malcontents, and the more the average citizen learns of the once unknown facts of political economy, the more it becomes apparent that not only economic soundness, but civilization as expressed in the present-day standard of living, is dependent to a very large extent upon the health, the ingenuity and the initiative of the machine tool industry.

Discussion of some of the general basic conditions surrounding the machine tool industry was an interesting part of Mr. Bryant's address. In a section on marketing methods he pointed out that a recent analysis showed that there are probably less than 1000 men engaged in the United States today in personally contacting users in the promotion or sale of machine tools. Machinery salesmen should have, and usually do have, a natural attraction to the shop, to methods of production, and to the applications of machine tools, he said. They must also know the lines they represent and what their machinery will do, where it is best applied, and what it will actually accomplish. Salesmen in the industry are recognizing the need for creative selling, "the job of making the prospect understand his need for what you have to sell," he said.

Through his personal contacts the machine salesman introduces to prospective users machinery which will increase their markets and their profits. He sells such machine tools with the endeavor in each transaction to create a permanent sense of gain for and of good will between himself, his manufacturer and his customer.

A number of elements of sales support were touched upon, including the importance of written descriptive material and the value of constructive

MEET AT SCHENECTADY

trade paper advertising on the part of machine tool manufacturers. Closely related to commercial advertising in importance is that of general publicity relative to the effectiveness of modern machine tools and their influence not only on individual industries but upon all business and upon society. One excellent result of the recent attacks on modern machinery by the ignorant and demagogic has been that for the first time in our economic history, there has been an articulate defense of the very sound principles back of production machinery, said Mr. Bryant. Such publicity must be carried on by machine tool manufacturers and by machine tool dealers through our individual companies, through personal discussions and through the coordinated and organized efforts of our two associations.

The importance of comprehensive expositions of advancements in machine tool design and operation were stressed as an aid to machinery selling. Educational exhibits at strategic points, for the general public were also advocated.

Something of the permanent exhibit of machine tools planned for the Rosenwald museum at Chicago was outlined by Tell Berna, general manager, National Machine Tool Builders' Association, Cleveland. This exhibit is designed to bring out to the general public the basic importance of the machine tool industry and of the progressive development of machine tools over several decades. In the lathe group there is needed a cone-driven engine lathe built around 1900. Information leading to the whereabouts of such a lathe, one that can be acquired for exhibit at the museum would be welcomed by his association, said Mr. Berna.

That customers' profits represent in the long run the only possible basis for machine tool sales was emphasized by W. E. Whipp, president, Monarch Machine Tool Co., and president, National Machine Tool Builders' Association, in a thought-provoking address on "Profits Make Sales."

We have had plenty of competitive selling; not enough creative selling, he said. The market can be divided into two classes: the first is the customer who sends in an inquiry; the second is the customer who needs new machine tools and doesn't know how badly he needs them. This second field, he said, is enormous. Many years of poor business have resulted in a tremendous pool of obsolescence. Instead of fighting for orders that present themselves without much sales effort, let's devote some thought and effort to the second type of business. This will be a service to our industry and a service to our customers, he added. This means a change in mental attitude which will lead to approaching the installation of a new machine tool from the customer's point of view and to develop clearly the profit he may expect from the new machine.

The nature of our market has changed, said Mr. Whipp. More service is demanded than in the past. But salesman have been given an opportunity to serve the customer as an expert consultant. Instead of sitting across the desk from his prospect and talking about the fine points of his machine, he is asked to move his chair around next to the customer and help analyze the project from the customer's own point of view.

For the most part our salesmen know their machine tools well, and that remains the first essential. But they need to go further; to train themselves to analyze our propositions from the profit point of view, to become "profit engineers."

While no two transactions are alike, the broad fundamentals are the same, said Mr. Whipp in another part. First comes a comprehensive study of the method now being used; next, a care-

front of first G-E built Curtis steam-turbine generator during the June 6 plant inspection Strong, Carlisle & Hammond Co.; E. R. Motch, Jr., Motch & Merryweather Machinery Turner, Strong, Carlisle & Hammond Co.; W. W. Radcliffe, E. A. Kinsey Co.; W. F. president, Gleason Works; A. S. Bush, Chas. A. Strelinger Co.; T. I. Shriver, V & O C. T. Bush, Chas. A. Strelinger Co.

ANOTHER group of machine tool dealers and guests en route through the Schenectady works of the General Electric Co. Left to right are: H. L. Rich, Lynd-Farquhar Co.; E. C. Elstad, Seifreat-Elstad Machinery Co.; W. T. Churchill, Vandyck Churchill Co.; J. Sauer, Jr., Peninsular Machinery Co.; J. Cetrule, Triplex Machine Tool Corp.; and R. E. Miller, The Iron Age.

ful and conservative study of what can be done with the new machines; and then comes the task of reducing this to terms of dollars of cost and profit. The report should end with a computation of the length of time that will be required for the savings to pay for the new machine or a statement of the percentage of return on the investment required.

The secondary profit that may result is not to be overlooked. The greater accuracy of the new machine may mean savings on the assembly floor in a different part of the shop.

Protect the Machine From Restriction

In an address on "The Lost Generation and What It Means To You," J. H. Van Deventer, editor, THE IRON AGE, pointed out that 20,000,000 Americans have reached employment age since 1929, and have never, therefore, experienced prosperous or even normal times. This "lost generation" will have a significant voice in public policy 10 years from now, and what it is hearing from prominent public personages and others as to the reason for the uncertainties and anxieties it has experienced since becoming of working age is of extreme practical importance, he said.

This "lost generation" is hearing that much of the present unemployment is due to progress in science and invention. It may see at the New York World's Fair many remarkable developments in invention and the mechanical arts. It may also see a technicolor picture depicting the ultimate in mechanization, and non-machine employment - creating demonstrations at the $500,000 WPA building there. Also to be seen is the extensive exhibit of Soviet Russia, which though reflecting the advantages of machine production, at the same time suggests how much better off we would be if machine production were put in the hands of the government.

Then, in reading the newspapers the lost generation learns of various measures proposed to offset technological unemployment. These are: (1) Taxation of users of improved machinery, based on the percentage of savings realized; and (2) legislation that, in disturbing the basic principles of American patent law, would retard the introduction of time and labor saving machinery.

He cited a Congressman's distinction between good and bad machines. The automobile, radio and other machines of that type are considered labor creating and therefore good; also machines which relieve workers from hard or dangerous toil. But time-saving machines, according to the Congressman, result in unemployment, poverty, distress and labor disturbance. Since 90 per cent of all machine tools are "time savers," this puts the machine tool among the "goats," said Mr. Van Deventer.

In another part, he pointed out that machine tools work collectively on parts of other machines, rather than on complete products, and in this respect are in a class by themselves. You cannot defend this or that particular machine tool; you have to take them collectively.

There is an educational job to be done by the machine tool industry, he said. If it is not done the durable goods industries will be materially hampered. The public has to be sold on the fact that it is to their interest to protect the machine from restriction. What is needed is some form of distribution system to sell the economic truth to the public, namely, profitable use of time-saving machines. He exampled this by the recent practice of one large lathe builder who stencils the four sides of each crate or box containing his machines with such slogans as "Improved Machinery Promotes a Higher Standard of Living" and "Another Machine to Make More Goods for More People." Other machine tool builders are doing their part by passing to their local newspapers copies of all articles pertaining to the economic value of machine tools. Other companies, notably General Electric, are in their national advertising calling attention to the advantages of machine made products by some such slogan as "More Goods for More People." To the same end he suggested that the machine tool dealers' association definitely organize local geographical public relations groups, which through newspapers, public libraries, etc., would help in getting the truth before the general public, including leaders of public opinion. With systematic and extensive publicity of the facts, the necessity for the defense of the time-saving machines would be over in a year, he said.

At the same session Dr. James S. Thomas, president, Chrysler Institute, Detroit, and president, Clarkson College of Technology, Potsdam, N. Y., addressed the convention on "New Frontiers for Smart People."

Operating Simplicity Needed

The excellent service rendered by the dealers was commented on by B. G. Tang, general superintendent, G-E Schenectady works, in a brief address on "How the Machine Tool Dealer Serves the Machine Tool Buyer."

The fact that old time mechanics are disappearing presents new problems to the machine tool designer and builder, he said, so that one of the first requisites of modern machine tool design is to provide simplicity of operation, although this frequently involves a more intricate design. Many functions formerly performed by the operator are now performed by the machine itself through liberal use of mechanical, electrical or hydraulic equipment that is automatic or semi-automatic in operation. Examples cited by Mr. Tang included vertical boring mills, at the Schenectady Works, with built-in electrical equipment that permits making of precision measurements automatically which formerly were made by the operator and required considerable skill and time. Another example is a vertical press having more than 30 punches and dies which can be power indexed to a single working center and which are all set up in advance to perform a multiplicity of operations in sequence. A horizontal boring mill has been equipped with telescope and periscope, through which the operator locates with speed and precision every hole to be bored.

Modern Tools Facilitate Airplane Engine Production

The nature of airplane engine production and the increasingly exacting requirements which modern, improved machine tools have helped the industry to meet were outlined in an interesting address by P. W. Brown, general superintendent, Wright Aeronautical Corp., Paterson, N. J.

In an address on "Assisting in Machine Tool Sales," J. E. N. Hume, commercial vice-president, industrial department, General Electric Co., outlined the relationship between the electrical industry and the machine tool industry. A number of samples of recent advertisements, including a series on "How Machines Create More Goods for More People," reflected the magnitude of G-E's advertising in the machinery field.

Inspection trips included a visit to the turbine and other manufacturing departments of the General Electric Co., a special exhibition in the G-E House of Magic, and a visit to the broadcasting studio, WGY. The Watervliet Arsenal, open for inspection on the afternoon of June 5, was also visited by a large number of members and guests of the association.

Steel Industry Seeking a Remedy for Bad Selling Practices in Sheets

BY T. C. CAMPBELL
Pittsburgh Resident Editor, The Iron Age

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THE recent period of widespread price concessions in flat rolled steel products, the fourth to occur since February, 1938, may in the not distant future warrant drastic changes in steel industry pricing policies. It is entirely possible that some steel companies might revert to taking business on a spot basis, rather than on a quarterly setup.

Since the code days price announcements have been generally made quarterly, such statements being made public about a month prior to the beginning of the quarter involved. However, in the past year or so these announcements, so far as major flat rolled steel products are concerned, have been nothing more than a mere formality. In many instances the published prices on hot and cold rolled sheets and strip were purely nominal except for those tonnages booked from miscellaneous buyers who, for various reasons, were unwilling or unable to cover their requirements during the brief period when price concessions were prevalent.

Considerable weight is given to the belief held by some that the present enormous capacity in flat rolled production is a basic reason for sporadic periods of flat rolled price concessions, when it is realized that sheets and strip alone have been specifically affected when price weakness occurs.

Effect of Basing Point Changes

Running a close second as a possible fundamental cause of bargain days, whereby customers are covered as far as six months in advance, might conceivably be the elimination of price differentials between some basing points and the establishment of a number of new basing points, both of which actions took place in June, 1938. How much either of the above reasons is responsible for the apparent chaotic price conditions in the flat rolled price structure is hard to determine, but there is ample circumstantial evidence that, taken together, these two factors are exceptionally important.

The addition of new basing points last June, coupled with the elimination of price differentials between Pittsburgh, Chicago and Birmingham, at least caused a tendency for steel producing centers to garner as many customers as possible within their local sphere in orler to hold freight absorption cost to a minimum. In many cases it undoubtedly meant that in order to gain this monopoly within the producers' area, concessions in prices were given. Although there is no factual evidence available to support this contention, there is enough circumstantial evidence to indicate that the increase in basing points has produced a tendency towards "steel principalities."

Such a tendency would mean that every steel producing center would attempt to barricade itself from competition outside and supply consumers in the surrounding area. This course of action would obviously fail for the simple reason that the consumption of steel in any steel producing center is somewhat less than the total amount of steel produced there.

With competition in the steel industry as keen as it is today, a price concession which might be given in one district in order to obtain business becomes generally known throughout trade circles within an exceptionally short time, and thereupon causes consumers in other parts of the country to demand the same concession. Several years ago it might have been possible for some steel producers to keep the knowledge of lower steel price offers from their competitors for some length of time, but experience during the past year at least shows that such an advantage is very short lived and is almost immediately met by other steel makers.

The result has been since February, 1938, that any break in sheet prices immediately becomes available to almost all consumers, and that in all cases where a competitive advantage is sought by a further cut in price, the market almost immediately again drops an amount equal to the maximum concession.

In the past there have been many cases where concessions below the published price were not met generally, but with extreme competitive conditions in the industry such times have passed. The full seriousness, as far as the steel industry is concerned, to be found in recent and periodic price weaknesses, is adequately indicated by steel company earnings reports during the past three quarters. Many companies are not financially able to go on this way indefinitely and it is for this reason that many observers in the steel industry look for the appearance of a new and different pricing policy. This might take the form of the elimination of quarterly and public announcements on steel prices as they have been made in the recent past.

The underlying policy will certainly be that all steel producers will remain competitive, no matter to what low level prices descend. The "catch," according to some persons in the steel trade, in present selling practices, lies in the fact that customers with contracts take in the steel if prices remain the same or increase, but cancel unshipped tonnages if the price structure sags. Although customers are supposed to receive shipment of steel purchased at concessions during the quarter in which consessions are grantel, in actual practice it does not turn out this way. In some cases shipments at the lower prices have been extended over a period as long as six months or more.

Spot Basis of Selling Suggested

One way to overcome these weaknesses in selling practices, some sources believe, is to put prices of at least flat rolled products on a spot basis, subject to shipment within 30 days of receipt of order. Such a plan during a price weakness period could mean as many as three or four different prices within a week's time, all aimed at meeting the maximum concession to be uncovered, and all business taken on this basis to be subject to shipment within 30 days of receipt of order.

This move would be drastic but at the same time would isolate, even though it intensified, price reduction periods. Those customers who were willing to take the chance and who were financially able to would benefit from the short lived lower quotations, while those who had no future plans on the use of the material or did not care to invest, would simply pay the new price which existed at the time they made purchases. Obviously, such price would be higher than the bargain quotations held open for a short length of time.

J. FREDERIC WIESE, who since 1935 has been assistant to the vice-president of Lukens Steel Co., Coatesville, Pa., has been appointed general manager of sales. After graduation from Swarthmore College in 1921, he joined the Chicago sales office of the Parkesburg Iron Co. and five years later joined Lukens Steel Co., serving in its flanging railroad and general sales department.

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E. EARL FISHER, who has been identified, since 1910, with the Colorado Fuel & Iron Corp., Denver, has been appointed sales manager of hot rolled products. He entered the company's sales department in 1923 and within four years was made a district sales manager at Oklahoma City. In 1933 the Eastern division of sales was assigned to him. He succeeds W. H. MESSNER, who has been assigned to other duties in the general offices.

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JOHN E. JACKSON has been elected president of the Pittsburgh-Des Moines Co., Pittsburgh, succeeding his father, the late William H. Jackson.

Mr. Jackson has been connected with Pittsburgh-Des Moines Co. and its affiliate, the Pittsburgh-Des Moines Steel Co. since his graduation from Iowa State College in 1924. He was manager of the incinerator department for a number of year and since 1935 has been general manager of the construction department.

WILLIAM R. JACKSON has been elected a director and assistant secretary and treasurer of the company. Other officers are: A. C. PEARSALL, vice-president; J. E. O'LEARY, vice-president; H. W. FORD, vice-president, and GEORGE A. SMITH, secretary and treasurer.

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DR. HARRY A. SCHWARTZ, author of "American Malleable Cast Iron" and many other contributions to the literature of metallurgy, especially those phases of it which have to do with malleable iron, has been awarded the E. J. Fox gold medal by the British Institute of Foundrymen. Dr. Schwartz is now in England to receive the award, which is for the first time going to an American. Dr. Schwartz was graduated from Rose Polytechnic Institute, which conferred upon him the degree of Doctor of Science in 1933.

Dr. Schwartz has for the past 37 years been associated with National Malleable & Steel Castings Co., Cleveland, and as director of research for that company he has been considered an authority on the metallurgy of malleable iron. His latest contribution to the literature of metallurgy is a description of an economical accurate method for the determination of hydrogen in ferrous metals. This invention by Dr. Schwartz provides a means of investigating the influence of hydrogen in steel and iron, which for a long time has been a moot question because of the expense of getting hydrogen determination with any degree of accuracy. It has been this type of practical metallurgical investigation that has characterized all Dr. Schwartz's work and the Fox medal award to him brings much satisfaction to his friends and associates.

Dr. Schwartz is attending the meeting of the British Institute as official representative of the American Foundrymen's Association and the Malleable Founders' Society.

J. F. WIESE

E. E. FISHER

. . . PERSON

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PARKER F. WILSON, former Wheeling Steel Corp. official, has been named president of the Pittsburgh Steel Foundry Corp., Glassport, Pa. Mr. Wilson at one time was vice-president and general manager of the Otis Steel Co., Cleveland. He succeeds G. A. HASSEL, who will continue with the Pittsburgh company as chairman of the board.

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MARSHALL L. HAVEY has been elected a vice-president of the New Jersey Zinc Co., New York. RALPH M. NEUMANN has been appointed general sales manager, continuing as manager of the pigment division of the New Jersey Zinc Sales Co. ARTHUR E. MERVINE has been appointed assistant general sales manager and continues as manager of the metal division of the Sales company.

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A. C. "BERT" GRAHAM, for 37 years traffic manager of the Youngstown Sheet & Tube Co., was honored at a luncheon June 5 by 300 transportation men, industrial executives and Sheet & Tube officers.

H. D. RHODEHOUSE, general traffic manager, Republic Steel Corp., who presided over the luncheon at Youngstown Country Club, emphasized that the affair was not a "farewell party," as Mr. Graham remains in a consulting capacity for Sheet & Tube.

FRANK PURNELL, president, Youngstown Sheet & Tube Co., and some of the other company officials were among the speakers. Testimonials were offered by representatives of railroads and by WILLIAM E. FOWLER, successor to Mr. Graham.

Mr. Graham was presented with numerous gifts, including a book of traveler's checks and a souvenir ticket printed by the seven railroads serving the Valley and good for transportation to various cities. The framed ticket wished him a long life journey.

J. E. JACKSON

DR. H. A. SCHARTZ

G. S. CRANE, whose appointment as vice-president in charge of sales and engineering of Cutler-Hammer, Inc., was announced in these columns last week.

SIGNALS . . .

LUKE E. SAWYER, formerly assistant general superintendent of the Babcock & Wilcox Tube Co., Beaver Falls, Pa., has been appointed general superintendent.

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GEORGE D. MOOMAW, for the past 13 years identified with the Crucible Steel Co. in an engineering and managerial capacity, has been appointed works manager of the Rustless Iron & Steel Corp., Baltimore. Prior to that he was superintendent of maintenance at the Canton plant of the old United Alloys Steel Co. and at one time electrical engineer with the Timken Roller Bearing Co.

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WALTER F. PERKINS, vice-president of Koppers Co. in charge of its Baltimore operations, has been elected a member of the board of directors of Koppers Co.

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N. A. LINCOLN has become works manager of Evans Products Co., Detroit. He has been closely allied with production and purchasing in the automotive industry for more than 20 years. Most of his experience was gained with the Hupp Motor Car Corp. over a period of 19 years. After leaving Hupp as director of purchases, he joined the Powel Crosley organization in Cincinnati to collaborate in developing the production and assembly plans for the new Crosley car, recently announced. In his new capacity with Evans, Mr. Lincoln will be in charge of all manufacturing and allied departments.

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ARTHUR KIERNAN has been appointed president of Berry Brothers, manufacturer of paints and varnishes. Mr. Kiernan, a graduate of Brown University, has had wide experience in manufacturing and distribution.

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R. J. O. SIMPSON, for many years associated in an official capacity with the L. S. Starrett Co., Athol, Mass., maker of small tools, has been made a director of the company, to succeed the late M. B. Waterman.

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EARL N. GRAF has been made Pittsburgh district manager with office at 855 West North Avenue, by John A. Roebling's Sons Co., Trenton, N. J.

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HEARTLY W. ANDERSON has been appointed sales representative for Crobalt, Inc., Detroit. Formerly the company's entire output was distributed by an outside sales organization. Henceforth the company will sell direct to the user or to machine tool manufacturers and tool shops.

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W. J. WESTPHALEN, president and general manager of the Lacledе-Christy Clay Products Co., St. Louis, has been reelected president of the American Refractories Institute.

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SAMUEL L. HOYT, formerly director of metallurgical research with the A. O. Smith Corp., has become a member of the staff of Battelle Memorial Institute, Columbus. Dr. Hoyt received a Ph. D. degree from Columbia University in 1914 and is known particularly for his leadership in the development of cemented tungsten carbides and for his work on heat resistant alloys.

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C. E. BARNER has joined the Wright Mfg. Division of American Chain & Cable Co., Inc., Bridgeport, Conn., as district sales manager, with headquarters at Cleveland.

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HENRY A. WEYER, engineer, formerly connected with the Nazel Engineering & Machine Works, Philadelphia, is now associated with the Chambersburg Engineering Co., Philadelphia.

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NORMAN R. ENTREKIN has resigned his connection with the Wheatland Tube Co., Philadelphia, to resume consultation work with offices in Philadelphia. Mr. Entrekin was for many years general superintendent of Worth Brothers at Coatesville, and later was general manager of the Worth Steel Co., Claymont, Del.

. . . OBITUARY . . .

H. G. MOORE, formerly vice-president and general sales manager of the Keystone Steel & Wire Co., Peoria, Ill., died in that city on June 2, aged 74 years. He retired 14 years ago.

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GEORGE P. GARDNER, who until his resignation last October had served on the board of the General Electric Co. for 43 years, died at his home in Bourne, Mass., on June 6, aged 83 years.

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HARRY B. THOMPSON, production manager of the Clark Equipment Co. plant at Buchanan, Mich., died recently. He was assistant superintendent of the axle department of the Buick plant at Flint until he went to the Clark Equipment plant in 1926 as assistant superintendent of the axle department there. Later he was advanced to superintendent and then production manager.

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ALFRED L. SAMPSON, for 39 years shop superintendent of the General Electric Co., Lynn, Mass., plant, died on June 8 at his summer home in West Alton, N. H. He was 75 years old and had been retired for a number of years.

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JOHN C. PUSICK, production manager for the Union Steam Pump Co., died June 6 at Battle Creek, Mich., from complications following an emergency operation for appendicitis. He was 42 years old. Mr. Pusick went to Battle Creek from Detroit as a designer for the pump company and later became production manager. He was an alumnus of Lawrence Institute of Technology, Highland Park, Mich., and Valparaiso University.

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ERVIN G. STACKEL, a salesman in Detroit for the Essex Wire Corp., died June 6, aged 40 years.

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HARRY SNEDECOR died June 3 in Cincinnati while on a business trip. He was southern sales manager for the Viking Mfg. Co., Jackson, Mich. He was 48 years old.

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AUGUST H. MATHIAS, founder of A. H. Mathias & Co., Pittsburgh, died June 4 at Miami, Fla.

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CHARLES THOMAS RICHARDSON, industrial diamond merchant of Detroit, died June 2 at the Mayo Brothers Clinic, Rochester, Minn., where he had gone for an operation. Born in Tilbury, Ont., Mr. Richardson went to Detroit when he was about 16 years old. Recently he had lived in Highland Park, Mich. He was 53 years old.

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ALFRED M. PRATT, general superintendent for John Hassall, Inc., wire nail manufacturer, Brooklyn, died of a heart attack at his home in Whitestone, Queens, on May 27, aged 43 years.

Ore Conditioning Unit Planned by T. C. I.

BIRMINGHAM, ALA.—Construction will be started within the next few weeks on a modern central ore conditioning and sintering plant of the Tennessee Coal, Iron & Railroad Co., plans for which were announced on Tuesday by President Robert Gregg. It is estimated that the plant will be ready for operation by late summer or autumn or 1940.

The plant will provide improved methods of preparing iron ore for efficient smelting in the blast furnaces. Crushing ore at individual mines will be discontinued. Ore will be loaded directly into railroal cars at the mines and transferred to the new plant where the ore will be dumped into primary crushers. After preliminary crushing the ore will be conveyed by belt conveyor to a second crushing station for final reduction. The ore then will go to a screening and continuous sampling station for separation into three sizes —coarse, medium and fine.

The coarse and medium grades will be sent to storage in steel silos. While in storage chemical analyses will be made of the ore. For removal to blast furnaces, ore will be fed from silos by proportional feeders according to definite standards of chemical analyses.

The fine grade ore will be conveyed from the screening station to storage bins at the sintering plant. Flue dust from the blast furnaces and coke braize also will be stored in adjacent bins. A portion of the fine ore will be mixed with the flue dirt and coke braize and sintered.

Some alterations of ore stocking facilities at the company's S. Fairfield blast furnaces will be required to coordinate the ore conditioning program.

. . . GREAT BRITAIN . . .

. . . *Steel production at high record . . . Semi - finished needed.*

LONDON, June 13 (*By Cable*)—Steel output for May in the United Kingdom, despite the Whitsun holiday, at 1,218,000 tons, beats the previous high record by 40,000 tons, and indications point that production is still upward. All available plants are now operating and much larger quantities of imported semi-finished steel are now required. Recent arrivals have enabled more regular rerolled production and air raid and defense deliveries are being maintained.

Most pig iron consumers have already placed estimated requirements well ahead and the market is now quiet. Pressure deliveries are unrelaxed, especially basic pig iron which totaled 450,000 tons of the May output of pig iron which was 690,000 tons. June specifications on hematite is better than anticipated.

It is now believed the Scrap Convention's American purchases totaled 400,000 tons of which over half was for the United Kingdom, 150,000 tons for Japan, 45,000 tons for Poland, 35,000 tons for Italy, 27,000 tons for Sweden.

Tin plate is quieter, with bookings under production, but consumption is still high. Makers are well booked and are still wanting up to 1s 6d base over the schedule.

There are no features on black sheets and galvanized sheets other than intense activity on home defense.

The Continent reports steady conditions with some works well filled until the end of the year and export demand broadening.

Pipe Award to French Held Up at Detroit

DETROIT—Award of a sizable order for water pipe to a French company by the city of Detroit Water Commission was recalled June 6 in a last minute decision by the Detroit common council. The Pont-a-Mousson Co. at Nancy, France, had submitted bids on 10,000 ft. of 6-in. iron pipe and 20,000 ft. of 8-in. pipe, approximately $6,000 lower than those of the Lynchburg Foundry Co. of Lynchburg, Va. The corporation counsel's office had informed the council that it could not ignore the low bid so it had been decided to spl't the order.

NLRB Stages Publicity Campaign To "Smear" Armco, Witness Says

WASHINGTON — Testimony that the National Labor Relation Board's case against the American Rolling Mill Co. constituted a deliberate attempt "to smear a reputable employer," and that one of the "most serious abuses of the Wagner Act is the board's admission of hearsay evidence at its proceedings was given the Senate Education and Labor Committee early this week by Robert T. Caldwell, of Ashland, Ky., counsel for the company.

Appearing before the committee during its current hearings on bills to revise the Wagner Act, Mr. Caldwell recalled that the NLRB inaugurated the complaint against the company's Ashland plant after the CIO union had been defeated in a collective bargaining elevtion at its Butler, Pa., plant by a three to one majority. He charged that Philip G. Phillips, NLRB regional director, who once characterized the complaint as one of the most sweeping ever undertaken by the board, issued a press release of "a highly inflammatory nature against the Rolling Mill Company," even before the complaint had been served and contrary to an express agreement with the company's counsel.

Charges Abandoned

Charges in the complaint that agents of the company had "assaulted and brutally beaten organizers, had broken into union offices and stolen records, had dominated the municipal government and civic organizations of the city, had caused the publication of anti-union news items, and had cooperated with other employers and associations in anti-union activities," were later withdrawn from the board's complaint and no effort was made to prove them, Mr. Caldwell related to the committee. He described this abandonment of the charges without attempt to prove them and the "premature publicity" given the original complaint as "a deliberate attempt to 'smear' a reputable employer. . . ."

The NLRB case against the firm, on which hearings have recently been concluded after running for 11 months, was based largely on hearsay evidence with second-hand or even third-hand hearsay being permitted by the examiner, the witness said. Referring to this practice as one of the "most serious abuses" used by the board, Mr. Caldwell continued:

"In numerous cases where a witness would be readily available, this board's counsel, instead of putting him on the stand, would call one of the complainants or other interested CIO members and have them testify to alleged statements by the witness not called, as to what some foreman or superintendent had told him. On being later interviewed these persons would frequently deny the occurrence of the incident and assert that the hearsay attributed to them was false."

A Fishing Expedition

The witness recalled that had "the dragnet subpoenas" been complied with, the board would have compelled the company to produce in court more than 500,000 separate records and documents, including records of 5000 to 6000 individual employees, as part of a "general fishing expedition" into company records launched "in the hope of finding something on which to base the charges of discrimination."

Mr. Caldwell related to the committee that one of the charges in the NLRB complaint involved an 18-year-old boy who was without previous experience but who was alleged to have been discriminated against because his father, a company employee, purportedly had failed to endorse an employees' representation plan. The company was required to put in its proof as to why it did not hire this boy, Mr. Caldwell explained.

Others Testify

Among other witnesses testifying before the committee were Harry S. Falk, of Falk Corp., Milwaukee, D. O. Fink, Auburn Foundry, Auburn, Ind., and E. A. Fowler, president, Foote Bros. Gear & Machinery Co., Chicago.

Since hearings opened before the Senate committee on April 11, members and spokesmen for the NLRB particularly have read into the record voluminous statements which have been widely distributed to the press. This has been interpreted to mean that the NLRB members were fearful that advocates of Wagner Act revision were making more headway in their fight to obtain a more equitable labor relations law than had at first been anticipated.

Several developments have indicated that opponents of revision are seeking desperately to head off effective demands for changes in the Wagner Act. The President's appointment of William Leiserson to replace Donald Wakefield Smith as a member of the NLRB, can be classified as one of these developments.

In addition, members of the committee have been seen by some observers as attempting to divert attention from the demands of employer groups by introducing evidence uncovered by the LaFollette Civil Liberties Committee relating to alleged anti-union activities of employers.

Also diverting attention from employers' testimony is the current hearings being conducted on the LaFollette bill which is designed to correct many of the practices alleged to have been uncovered by the LaFollette committee.

Social Security Tax Burden Lightened

WASHINGTON — The House acted to slightly lessen tax burdens and to slightly liberalize benefits under the Social Security Act last week by passing and sending to the Senate a bill to revise the law, representing the first successful attempt at revision after almost four years of experience under the present act. Attempts to further liberalize the benefits so that amendments would more closely approach the Townsend plan benefits were defeated but are expected to be pushed again on the Senate side, where hearings opened on Monday. Briefly, the changes approved by the House include:

1. Old-age insurance taxes would be stabilized at 1 per cent each from employers and employees until 1942 in lieu of advancing to 1½ per cent each next year. Before the rate of 2 per cent becomes effective in 1942, this change is estimated to save contributors $825,000,000.

2. States maintaining unemployment reserve funds and unemployment benefits of a required standard may reduce their contributions and 43 states would be able to do this in 1940, at an estimated saving of $250,000,000 to employers in that year if they all took advantage of the provision. Average rate for employers could be reduced from 2.7 per cent to 2 per cent.

3. A change which is expected to save employers $65,000,000 a year is a provision in the bill calculating unemployment insurance taxes from employers on the first $3,000 of each employee's earnings, instead of the entire payroll as at present.

4. A saving of $15,000,000 to employers is expected to result from refunds and abatements to those who paid their contributions to state funds late.

New or Modernized Facilities Replace Old Steel Mills

SINCE 1926 the steel industry has abandoned or dismantled a total of 173 blast furnaces, 39 plants for producing steel ingots and 144 plants for producing finished iron and steel products.

The total number of employees in the industry, however, has increased sharply during the period. A new peak for the number employed in the industry was established in 1937, indicating that the improved technology of steel production has not decreased employment, while the total number at work in 1939 is substantially higher than in 1926. These facts have been determined by the American Iron and Steel Institute from a study of reports furnished by companies in the industry.

Substantially all of the plants which were abandoned or scrapped had been rendered obsolete or inefficient by the improved technology of steel and iron production. Fewer than a dozen plants were abandoned as a direct result of mergers or consolidations.

The decline in productive capacity from the abandonment of obsolete plants has been more than offset by the construction of new and more efficient plants and by the modernization of existing facilities. As a result, the industry's present capacity for producing steel is 30 per cent greater than in 1926, while its capacity for producing pig iron, which has become relatively less important as a steel-making material, has remained steady.

Between 1926 and 1938, 14 new blast furnaces were built, averaging 2½ times the capacity of the furnaces abandoned during the period. In addition, 12 entirely new steel ingot plants and 42 new plants for producing finished steel have been constructed since 1926.

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★ Have longer useful life

★ Increase lifting power

★ Reduce handling costs

★ Cut maintenance

★ Provide greater flexibility in handling

NORTHERN ENGINEERING WORKS *Detroit, Michigan*

CRANES *Northern* HOISTS

Carnegie-Illinois Sells Plant at Cambridge, Ohio

CAMBRIDGE, Ohio — Carnegie-Illinois Steel Corp. has recently sold its abandoned Cambridge plant to the Hetz Construction Co., Inc., of Warren,, Ohio. The construction company has subdivided the plant into factory sites and will, with the cooperation of civic officials, attempt to relocate industry in this community in order to make up for the abandonment of the steel plant.

The Hetz company has had experience in this type of relocation work in Richmond, Va., and is now handling the same kind of a project at New Eagle, Pa., as well as several other locations. If the division of the Cambridge plant into numerous small parcels, giving due consideration to railroad sidings, street entrance, etc., is a success, there is a good possibility that Carnegie-Illinois will employ this same method to liquidate other idle plants.

According to the Hetz company, the location of the parcels of land made from the steel plant site is as strategical for other industries as it was for tin plate production, and there is enough variety of types, sizes, etc., of buildings to accommodate the requirements of almost any kind of industry from the manufacture of cigars to the heavy industry such as forging and fabricating shops.

Harvester Denies Charges of NLRB

CHICAGO—Sydney G. McAllister, president, International Harvester Co., last week denied charges of the NLRB that his company had engaged in unfair labor practices at six of its plants.

A complaint filed with the board by the Farm Equipment Workers of America, an affiliate of the CIO, said the company supported company unions at its plants in Chicago, Rock Falls, Rock Island, East Moline, and West Pullman, Ill., and in Milwaukee. G. L. Patterson, regional director of the labor board, estimated that over 20,000 persons are employed in the plants named.

Terming the charges untrue, Mr. McAllister pointed out that the CIO has won three out of six elections held at the plants named, the independent organizations being the victor in the other three elections. The Labor Board has said, according to Mr. McAllister, that any union would be disqualified in which even a small minority of its members joined by reason of unauthorized acts of interference or encouragement on the part of some foremen. The rule apparently holds true even if such acts were unintentional and unknown.

Mr. McAllister, in a two-page letter to employees, said further, "We do not know whether any employees joined any union because of any such unauthorized action, but if they did we believe it could only have been a very small number and we question whether it is a legal or appropriate remedy for such a situation, to destroy a union which has been freely created and chosen as a bargaining agency by the great majority of its members.

"Such a procedure seems peculiarly inappropriate when the Labor Board has power to order and conduct a secret election which would quickly give to every employee an opportunity to reaffirm or change his former choice of bargaining agency."

Bethlehem to Issue $25,000,000 in Bonds

BETHLEHEM STEEL CO. has filed with the Securities and Exchange Commission a statement covering the issuance of $25,000,000 of consolidated mortgage 20-yr. sinking fund 3¼ per cent bonds, series F, due on July 1, 1959.

The statement declared that $21,400,000 of the amount will be paid to Bethlehem Steel Co. (Pa.) to replace in part the amount by which that company's working capital was reduced as a result of the retirement of its first lien and refunding mortgage bonds and the first consolidated mortgage bonds of the Lackawanna Steel Co. The balance of the proceeds of the issue will also be paid to the Bethlehem Steel Co. (Pa.) to provide for additions and betterments to properties, for working capital and for other purposes.

Pittsburgh Steel Foundry Strike is Settled

GLASSPORT, PA.—A strike at the plant of the Pittsburgh Steel Foundry Corp., here, which began March 2, was settled last week and employees were expected to return to work in the near future. According to the SWOC, the employees will return under the same wage conditions as before the strike. The company had requested a 15 per cent wage cut.

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ENGLAND Burton, Griffiths & Co., Ltd.
ERIE
ERIE BUILDS Dependable HAMMERS

T. C. I. Ordered to Give $390,000 Back Pay to Miners

BECAUSE the Tennessee Coal, Iron and Railroad Co. posted a shutdown notice when the recent coal "holiday" started, the Appeals Board of the Alabama Department of Industrial Relations has ruled that the company's miners, about 5300, are entitled to unemployment compensation benefits for the seven weeks they were idle. This will amount to about $390,000. The ruling is subject to appeal by the state.

It has also been ruled that employees of companies not posting such a notice were not entitled to unemployment compensation.

The Alabama unemployment compensation law specifies that no benefits may be paid to an employee whose idleness is directly due to a labor dispute.

In the case of the Tennessee Coal, Iron & Railroad Co., the board held that the company's action in posting the shutdown notice precluded any contention that the shutdown was due to a labor dispute.

Honing Equipment Corp. Organized at Detroit

DETROIT—A new corporation covering the field of honing tools and machinery has been organized under the name of the Honing Equipment Corp., with headquarters at 4612 Woodward Avenue, Detroit. J. A. Carlin, president of the new company, is an engineer who has been closely identified with the manufacture of honing tools and machinery. When Hutto Engineering Co., Inc., got into financial difficulties in 1930, Mr. Carlin was appointed receiver. In 1931 the receivership was lifted, and in the reorganization he was made vice-president and general manager. In 1935 when the Carborundum Co. of Niagara Falls, N. Y., took over the business and made it a division of their organization, Mr. Carlin was retained as general manager of the new division, a position which he held until the Carborundum Co. sold the business.

C. W. Floss, vice-president in charge of engineering, was one of the organizers and engineers of the Jeschke Tool Corp., which later became the Micromatic Hone Corp. He has been connected as an engineer with the automotive industry for many years and for several years has been active as a consulting engineer with offices in this city.

Michigan Seeks Advice Of Industrial Buyers

INDUSTRIAL purchasing agents from Michigan firms, serving as a purchasing committee for the State Administrative Board in Michigan, have been asked by Auditor-General Vernon J. Brown to make expert recommendations about the state's methods of making purchases totaling $15,000,000 a year. Buyers from the General Motors Corp., Chrysler Corp., Ford Motor Co., J. L. Hudson Co., Michigan State Farm Bureau, Michigan Manufacturers Association and the Michigan Association of Purchasing Agents are serving on the committee.

Knudsen Award Goes to Dr. C. O. Sappington

DETROIT—A new book "Medico-Legal Phases of Occupational Diseases" by Dr. C. O. Sappington, of Chicago, has resulted in Dr. Sappington's receiving the W. S. Knudsen Award for the most outstanding contribution to industrial medicine and health in 1938-1939. Mr. Knudsen, president of General Motors Corp., made the award which was presented at the convention of the American Association of Industrial Physicians and Surgeons in Cleveland. Dr. Sappington, industrial medical consultant, is a leading exponent of the practice of making employee examinations the basis of adapting the employee to the job for which he is best suited.

Micromatic Hone Orders Heaviest in History

DETROIT — Micromatic Hone Corp., Detroit, has the largest volume of unfilled orders in the history of the firm, according to a statement in a letter to stockholders issued by Kirke W. Connor, president, in connection with an offering of 17,595 shares of the corporation's 7 per cent cumulative convertible preferred stock. The letter continues that production capacity "will be crowded for at least the third quarter if not for the balance of the year." Cylinder honing equipment for automotive, aircraft and military work constitutes the largest part of the company's volume.

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Steel Imports Rise in April

IMPORTS of iron and steel products (scrap excepted) into the United States in April totaled 41,314 gross tons valued at $2,703,290, according to preliminary figures just released by the Metals and Minerals Division of the Bureau of Foreign and Domestic Commerce. These figures compare with the 24,589 tons valued at $1,478,663 imported in March, and the 21,225 tons valued at $1,140,875 which were imported in April, 1938.

Scrap imports were also higher in April at 2769 tons valued at $29,366, compared with 780 tons priced at $11,927 imported in March. Only 12 tons valued at $385 were imported in April, 1938.

Union Carbide Units Open New Cleveland Offices

CLEVELAND district offices of the Linde Air Products Co., Carbide & Carbon Chemicals Corp., and the Haynes Stellite Co., all of which are units of Union Carbide and Carbon Corp., are now located at 1517 Superior Avenue, Cleveland. The entire building is occupied by sales and process service departments of these companies.

The district managers are H. H. Dyar, for the Linde company; E. E. Fogle, for Carbide & Carbon Chemicals Corp., and F. P. Shephard, for Haynes Stellite.

Gear Sales Increase

THE American Gear Manufacturers Association reports for the gear industry in the United States an increase in sales for May of 6 per cent over April. Compared with May, 1938, the gain is 33 per cent. The first five months of 1939 reflect a gain of 14 per cent over the same period of 1938.

As gearing is intimately related to practically every industry, it is believed that trends in the gear industry are indicative of industrial trends in general.

Imports at Philadelphia

PHILADELPHIA—The following iron and steel imports were received here during the past week: 6012 tons of chrome ore from Cuba; 545 tons of pig iron from The Netherlands; 22 tons of wire rods and five tons of steel billets from Sweden.

The Pennsylvania had the problem of transporting steam from the Pennsylvania Power & Light Company's plant in Harrisburg to the railroad's new engine house—a distance of a mile and a half. The problem was solved by erecting an 8" overground pipe line and insulating it with 85% Magnesia covering.

Insulation was applied in two layers, each approximately 1½" thick. Sections were laid in broken joint manner to secure maximum strength. Pipe covering protected from the weather by an overall covering of roofing fabric.

Whatever your problem in the control or transportation of heat or steam, it will pay you to investigate the use of Carey Insulations in solving that problem economically and with maximum efficiency. Carey service is available through a nationwide organization. Write today for Carey Insulation Catalog—address Dept. 26.

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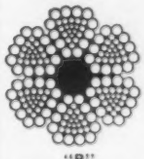
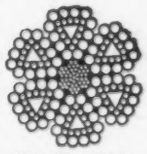
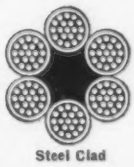
Style B Flattened Strand


"B" Flattened Strand


Wire Rope Center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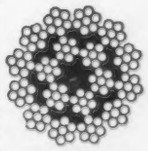
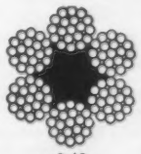
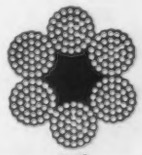

18x7 Non-Rotating


6x19 Filler Wire

6x19 Scale


6x37 Extra Flexible

8x19 Extra Flexible

MONTHLY SHIPMENTS OF FINISHED STEEL PRODUCTS BY UNITED STATES STEEL CORP.—GROSS TONS

Month	1935 Shipments	1935 Per Cent of Capacity	1936 Shipments	1936 Per Cent of Capacity	1937 Shipments	1937 Per Cent of Capacity	1938 Shipments	1938 Per Cent of Capacity	1939 Shipments	1939 *Per-Cent of Capacity
January	534,055	31.9	721,414	44.8	1,149,918	75.4	518,322	33.7	789,305	51.8
February	583,137	39.2	676,315	45.3	1,133,724	82.5	474,723	35.5	677,994	49.3
March	668,056	41.5	783,552	50.5	1,414,399	92.7	572,199	37.2	767,910	50.4
April	591,728	36.7	979,907	63.2	1,343,644	91.0	501,972	33.7	701,459	47.5
May	598,915	35.8	984,097	63.4	1,304,039	85.5	465,081	30.2	723,165	47.4
June	578,108	36.7	886,065	57.1	1,268,550	85.8	478,057	32.1	.....	...
July	547,794	34.0	950,851	61.3	1,186,752	77.9	441,570	28.8	.....	...
August	624,497	37.3	923,703	59.6	1,107,858	72.6	558,634	36.3	.....	...
September	614,933	39.7	961,803	62.0	1,047,962	71.1	577,666	37.5	.....	...
October	686,741	41.1	1,007,417	62.6	792,310	52.0	663,287	43.1	.....	...
November	681,820	42.3	882,643	59.2	587,241	39.7	679,653	45.6	.....	...
December	661,515	42.7	1,067,365	68.8	489,070	32.1	694,204	45.2	.....	...
Minus yearly adjustment	(—23,750)	...	(—40,859)	...	(—77,113)	...	(+30,381)	...	.....	...
Total for year	7,347,549	38.1	10,784,273	58.2	12,748,354	70.4	6,655,749	36.7	.....	...

*Annual finished steel capacity 17,940,600 gross tons, with monthly percentages based on actual number of weeks in each month.

U.S. Steel Shipments Up 21,706 Tons in May

SHIPMENTS of finished steel products by subsidiary companies of United States Steel Corp. for May, 1939, were 723,165 tons. The May shipments compare with 701,459 tons in April an increase of 21,706 tons, and with 465,081 tons in the corresponding month in 1938 (May), an increase of 258,084 tons.

For the year 1939 to date, shipments were 3,659,833 tons compared with 2,532,297 tons in the comparable period of 1938, an increase of 1,127,536 tons.

CAST IRON PIPE

North Kingston, R. I., has plans for a water supply system to cost approximately $225,000. Jenks & Ballou, Providence, R. I., are engineers.

Water Department, Duluth, Minn., plans extensions in 10-in. main water lines in parts of Chambersburg Avenue, Orange Street and Anderson Road; also extensions in 6-in. pressure lines for gas distribution in same area. Cost about $55,700.

Silverton, Ore., plans pipe line extensions in water system, including main line in part of James Avenue; also new elevated steel tank and tower at Liberty Hill and other waterworks installation. Financing is being arranged through Federal aid.

Laurel, Mont., plans pipe line extensions in water system, including replacements in several existing mains. Cost about $57,000, of which $36,180 will be secured through Federal aid. T. A. Rigney is city engineer.

Controller, City-County Building, Pittsburgh, closes bids June 16 for pipe lines for water system in Fifth Avenue, from University Place to Soho Street, Oakland district. Cost about $75,000.

South Lebanon, Ohio, plans pipe lines for water system; also 50,000-gal. steel standpipe, electric-operated waterworks pumping station and other installation. Cost about $54,000.

King County Water District 58, Renton, Wash., W. C. Purcell, 7171 Third Avenue, Renton, in charge, has approved installation of about 4½ miles of 2 to 8-in. pipe for water system; also 50,000-gal. storage tank and other waterworks installation. Parker & Hill, Smith Tower Building, Seattle, are consulting engineers.

Water Department, Grand Rapids, Mich., has awarded contract to Lyon Construction Co., Whitehall, Mich., at $217,680 for lake intake pipe line and intake for new water system from Lake Michigan.

Water Department, Reading, Pa., plans pipe line extensions in water system, including new trunk line from reservoir on Green Street to connection with distribution mains. Cost close to $40,000.

Hinsdale, Mont., plans pipe line for main water supply, about 3650 ft. long, in connection with new 150,000-gal. reservoir. Financing is being arranged through Federal aid.

Premont (Jim Wells County), Tex., plans pipe lines for water system and other waterworks installation, including pumping station and reservoir. Cost about $52,000. Financing has been arranged through Federal aid.

South Pasadena, Cal., has awarded 433 tons of 2, 4, 6, 8, and 12-in. pipe to National Cast Iron Pipe Co., Los Angeles.

Yakima, Wash., has awarded 1200 tons of 2, 4, 6, 8, and 12-in. pipe and fittings for water system to Yakima Hardware Co.

East Bay Municipal Utility District, Oakland, Cal., has awarded 1725 tons of 4 to 20-in. pipe as follows: 1500 tons to United States Pipe & Foundry Co., San Francisco and 225 tons to American Cast Iron Pipe Co., San Francisco.

Inglewood, Cal., has awarded 331 tons of 6 and 8-in. pipe to United States Pipe & Foundry Co., San Francisco.

Tucson, Ariz., which took bids on 200 tons of 2 to 8-in. pipe has awarded the material to transite interests.

. . . PIPE LINES . . .

Peoples Natural Gas Co., Omaha, Neb., plans extensions in welded steel pipe line to Grand Junction, Iowa, for natural gas transmission for local distribution in municipality, where service franchise is being secured. Control station will be built at city limits.

Water Department, Toledo, Ohio, will ask bids on or about June 20 for 100-in. steel pipe line for connecting conduit for new intake crib on Lake Erie, about 15,800 ft. in all, with alternate bids on concrete pipe. At same time bids will be asked for crib construction, forming part of new lake water supply system. Estimated cost of work noted (Contract Division F), $1,750,000. On or about June 27, bids are scheduled to be called for 78-in. steel pipe line for main water supply, about 11,200 ft. long, and elevated steel tank (Contracts Division H and I), estimated cost $1,500,000. Other bids for different pipe lines and waterworks structures will be asked during summer. Greeley & Hansen, 6 North Michigan Avenue, Chicago, are consulting engineers.

Northern Pipe Line Co., Mount Pleasant, Mich., will make connection with system of Consumers Power Co., Jackson, Mich., at Midland, Mich., with new 6-in. welded steel pipe line from gas field at Arenac, Mich., on which work was recently begun. Line will be about 55 miles long and will be used for natural gas transmission for Consumers company for local distribution in Bay City and Saginaw, Mich., districts. Cost about $200,000 with booster stations and other operating facilities.

Empire Gas & Fuel Co., Wellsville, N. Y., plans 2-in. steel pipe line from point near Ackerman Hill to vicinity of Willing, Allegheny County, for natural gas transmission. Distribution will be carried out in latter district. Cost close to $40,000 with service facilities.

Metropolitan Utilities District, Eighteenth and Harney Streets, Omaha, Neb., Col. T. A. Leisen, secretary, plans steel pipe lines for gas distribution in districts Nos. 865 and 868, recently created.

Center, Tex., is considering steel pipe lines for municipal natural gas distribution, including main welded steel pipe line for connection with supply source, control station and operating facilities. Cost about $40,000.

Beaver Utilities, Ltd., Beachville, Ont., plans steel pipe lines for local natural gas distribution. Work is scheduled to begin soon.

Rail Equipment Orders Climb 50% in 1939

PURCHASES of equipment (locomotives and cars) and of materials from the manufacturing industry in the first five months of 1939 are estimated by *Railway Age* at $232,520,000. This compares with $156,253,000 in the first five months of 1938, an increase of 50 per cent. Compared with the purchases of about 614 million dollars made in the first five months of 1929, however, it represents a decline of 381 million dollars, or 62 per cent. These purchases in the corresponding part of 1936 were 275 million dollars and in 1937 were 452 million, the decline in 1939 as compared with 1937 being 48 per cent.

Stilwell Sees Future Threat to U. S. Trade in British Expansion

CLEVELAND — Within recent months a striking change has brought about greater unity of purpose in both England and France, Clifford S. Stilwell, executive vice-president, Warner & Swasey Co., said this week following his return from Europe.

Last fall there was a heterogeneous attitude in both nations, he explained. This has disappeared and virtually all France and England may be said to be solidly behind their respective governmental programs. Taxpayers and workmen, previously apathetic, are cooperating to the fullest extent.

New plants are springing up throughout England and will develop efficiency and capacity such as that nation has never before enjoyed, said Mr. Stilwell, pointing out that the expansion eventually may very well bring about a serious challenge to the leadership of the United States and a realinement of present world markets, unless the United States is very alert.

Meanwhile, the far-sighted British are protecting their markets to the best of their ability. Buying American equipment for their new plants makes it possible for British producers to be in active competition elsewhere.

The disturbing factor to the British is that money keeps flowing to the United States as a result of these purchases. Increasingly, attempts are being made to handle sales through English sales agencies.

In general material production, England and France are fast pulling up on Germany, said Mr. Stilwell. By comparison, the policy of the United States appears very desultory. The visitor abroad cannot escape the conviction that the next war, if it comes, will depend acutely upon machine shop production, he asserted.

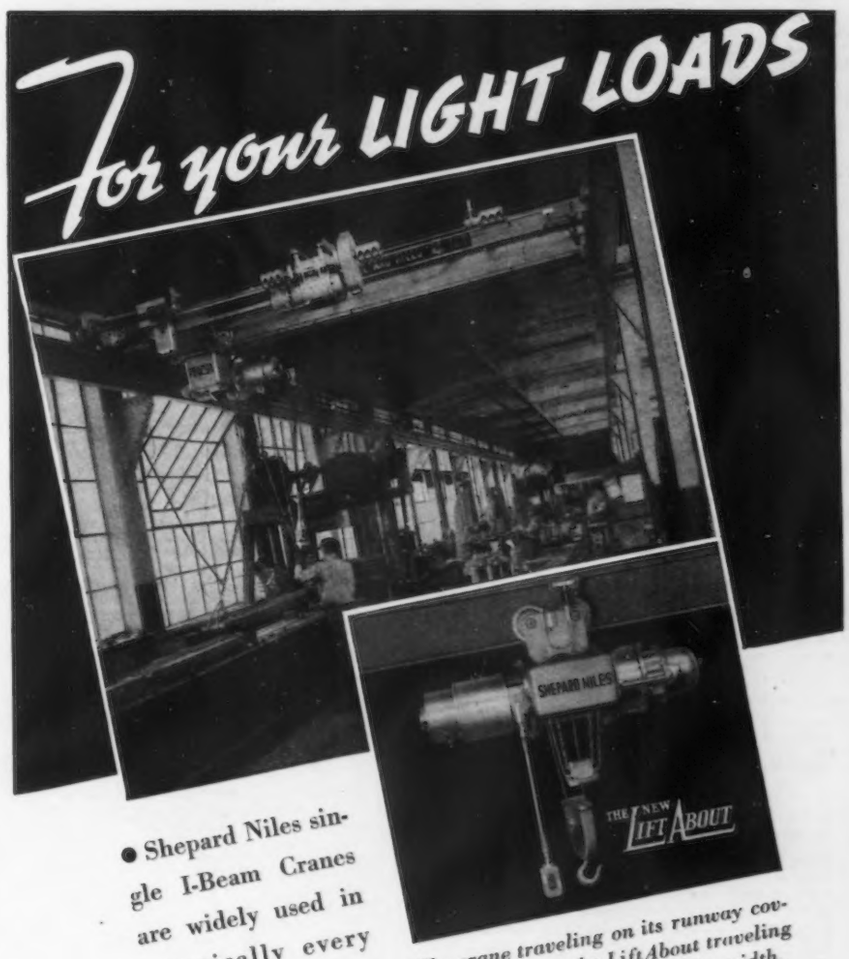
CIO Rioters for Closed Shop Keep Allis-Chalmers Idle

MILWAUKEE — Rioting outside the strikebound plant of the Allis-Chalmers Mfg. Co. Tuesday resulted in the injury of four persons, including two policemen, and the stoning of a street car filled with company office employees en route to work. Tear gas containers were fired at the mob of pickets by police and sheriffs' deputies, who were attempting to prevent disturbances.

The work holiday (reported on page 102 of the June 8 issue of THE IRON AGE) formally became a strike last Saturday when a declaration was made by the union, a UAW chapter. Production employees at the plant, numbering over 6000, have been idle for three weeks. About 1000 office employees worked unhindered during the work holiday, but since the formal strike call was issued, they have been booed and molested, culminating in the stoning.

Allis-Chalmers officials issued a statement declaring the company could not give in to the demands of the labor group "for a union or closed shop, checkoff system, and a joint contract to cover the operations of the Milwaukee, Pittsburgh and Boston plants."

It was said that wage increases asked would amount to twice the company's total 1938 earnings.



The crane traveling on its runway covers the length—the LiftAbout traveling on the crane beam covers the width.

● Shepard Niles single I-Beam Cranes are widely used in practically every industry for loads up to five tons capacity.

● This single I-Beam Crane combined with the new Shepard Niles LiftAbout will cover every square foot of the bay with vertical lifts, eliminating all side pulling and dragging of loads.

A COMPLETE LINE OF CRANES AND HOISTS

SHEPARD NILES CRANE & HOIST CORP.

356 SCHUYLER AVENUE
MONTOUR FALLS, N. Y.

FABRICATED STEEL

NORTH ATLANTIC STATES
AWARDS

5400 **Tons,** Brooklyn, Shore Road Parkway viaduct, contract MS-39-9, to American Bridge Co., Pittsburgh.

3600 **Tons,** New York, store and office building for Rockefeller Center, Inc., to Bethlehem Steel Co., Bethlehem, Pa.

780 **Tons,** Bedford, Pa., bridge section, to American Bridge Co., Pittsburgh.

750 **Tons,** Pittsburgh, incinerator plant, to Pittsburgh-Des Moines Steel Co., Pittsburgh.

600 **Tons,** Wilmington, Del., hospital for crippled children for Nemours Foundation, to American Bridge Co., Pittsburgh.

295 **Tons,** Rochester, N. Y., Nazareth Academy, to F. L. Heughes & Co., Rochester.

265 **Tons,** Northeast, Md., State bridges, to Bethlehem Fabricators, Inc., Bethlehem, Pa.

250 **Tons,** Weathersfield, Vt., Perkinsville Village bridge, to American Bridge Co., Pittsburgh.

210 **Tons,** Fleetwood, N. Y., viaduct, to American Bridge Co., Pittsburgh.

200 **Tons,** Washington, jail, to Bethlehem Steel Co., Bethlehem, Pa.

185 **Tons,** Palmyra, N. Y., Garland Packing Co. addition, to F. L. Heughes & Co., Rochester, N. Y.

SOUTH AND SOUTHWEST

361 **Tons,** Nacogdoches, Tex., bridge, to Bethlehem Steel Co., Bethlehem, Pa.

235 **Tons,** State of New Mexico, Bureau of Reclamation, penstocks, Specification 1217D, to Thomson Mfg. Co., Denver.

170 **Tons,** Lexington, Ky., Home Economics building, to Louisville Bridge & Iron Co., Louisville, Ky.

CENTRAL STATES

1200 **Tons,** Ross County, Ohio, State bridge, to Fort Pitt Bridge Works Co., Massillon, through C. R. Boulton, Columbus, Ohio.

500 **Tons,** Chicago, two-story store and office building, Randolph and State, to Bethlehem Steel Co., Bethlehem, Pa.

275 **Tons,** Cleveland, Valleyview housing project, to Republic Structural Iron Works, through Sam W. Emerson Co., Cleveland.

260 **Tons,** Minneapolis, Minn., destructor plant, to Minneapolis-Moline Power Implement Co., Minneapolis.

255 **Tons,** Adams County, Ohio, State bridge, to Bethlehem Steel Co., Bethlehem, Pa., through Midland Construction Co., Columbus.

240 **Tons,** Springfield, Ohio, building for Denton's, Inc., to C. M. Marks Co., Columbus.

198 **Tons,** Chicago, Milwaukee Road, track elevation repairs, to American Bridge Co., Pittsburgh.

155 **Tons,** Beatrice, Neb., auditorium, to St. Joseph Structural Steel Co., St. Joseph, Mo.

125 **Tons,** Cincinnati, Longview State Hospital buildings, to Pittsburgh Bridge & Iron Co., Pittsburgh.

110 **Tons,** Eddy County, N. D., bridge, to American Bridge Co., Pittsburgh.

WESTERN STATES

325 **Tons,** Great Falls, Mont., civic center building, to Minneapolis-Moline Power Implement Co., Minneapolis, Minn.

215 **Tons,** Leavenworth, Wash., fish hatchery, Bureau of Reclamation, to American Bridge Co., Pittsburgh.

120 **Tons,** Yegen, Mont., Canyon Creek bridge for Northern Pacific Railway, to American Bridge Co., Pittsburgh.

Unstated Tonnage, Los Angeles, 200-ton gantry crane for Department of Water and Power, to Harnischfeger Corp., Milwaukee.

PENDING STRUCTURAL PROJECTS

NORTH ATLANTIC STATES

9200 **Tons,** Woodbridge, N. J., including 200 tons of castings, superstructure, high-level bridge over Raritan River, route 35, section 14; bids due July 7.

4500 **Tons,** Washington, municipal center, administration building.

750 **Tons,** Lancaster, Pa., building, Armstrong Cork Co., Hughes Foulkrod Co., Philadelphia, general contractor. (Previously reported.)

600 **Tons,** Somerset County, Pa., highway project; bids received by Pennsylvania Turnpike Commission until June 23.

550 **Tons,** Westmoreland County, Pa., highway project; bids taken by Pennsylvania Turnpike Commission until June 23.

500 **Tons,** Rockville, N. Y., State bridge FAGH-8529.

446 **Tons,** Montgomery and Schenectady Counties, N. Y., including 65 tons reinforcing bars, highway project S.S. 39-2. Bids close June 28.

325 **Tons,** New York, warehouse for Wamkill Realty Corp.

300 **Tons,** Queens, N. Y., Southern Parkway bridge.

250 **Tons,** Sebattis, N. Y., State bridge RC-4017.

250 **Tons,** Pittsburgh, River Ave. viaduct.

250 **Tons,** Fulton County, Pa., bridges for Pennsylvania Turnpike Commission.

215 **Tons,** Quincy, Mass., buildings for Procter & Gamble Mfg. Co.

200 **Tons,** Philadelphia, building for Schooler Bros.

200 **Tons,** Orange County, N. Y., highway project, R.C. 4033; bids close June 28.

170 **Tons,** Philadelphia, Pa., leanto, etc., Specification No. 9010, for Navy Department.

165 **Tons,** Thompson, Conn., State bridge.

126 **Tons,** Oneida County, N. Y., including 57 tons of mesh, highway project R.C. 4031; bids taken until June 28.

125 **Tons,** Warren, Me., State bridge.

110 **Tons,** New York, building for Times Square Terminal, Inc.

CENTRAL STATES

656 **Tons,** Madison, Wis., State bridge letting, eight bridges; bids June 20.

600 **Tons,** Cloquet, Minn., State bridge No. 5273.

500 **Tons,** Milford, Ohio, State bridge.

440 **Tons,** Akron, Ohio, State railroad crossing elimination; new bids June 20 (previously reported).

300 **Tons,** Youngstown, Hillman High School; bids June 16.

275 **Tons,** Cleveland, State hospital building.

265 **Tons,** repairs to bridges for Santa Fe Railroad, various locations.

225 **Tons,** Quincy, Ill., building for Gardner-Denver Co.

185 **Tons,** Petersburg, Ill., State highway bridge; bids June 16.

160 **Tons,** Cleveland, Receiving Hospital; bids in.

150 **Tons,** Chicago, office building, garage, and material bins, Department of Public Works; bids June 21.

110 **Tons,** Lucas County, Ohio, State crossing elimination in Ottawa Hills Village; new bids June 20 (previously reported).

100 **Tons,** Cleveland, grade school; bids June 29.

THE SOUTH

2235 **Tons,** Rutledge, Tex., ring-follower gates for Marshall Ford Dam; Hardie Tynes Mfg. Co. and Koppers Co., joint low bidders.

265 **Tons,** Coinjock, N. C., highway bridge for U. S. Engineers.

WESTERN STATES

850 **Tons,** Grand Coulee Dam, power house frame; American Bridge Co., low bidder.

260 **Tons,** San Francisco, junior college gymnasium; bids June 16.

250 **Tons,** San Francisco, Coast Guard air station; bids June 20.

FABRICATED PLATES
AWARDS

7000 **Tons,** Grand Coulee Dam, 11 drum gates for spillway (previously reported unstated tonnage); bids July 12.

4000 **Tons,** Chicago, section S7, subway tunnel liners, to Carnegie-Illinois Steel Corp., Pittsburgh, through M. J. Boyle, Chicago, contractor.

2000 **Tons,** Fulton County, Pa., section S2, tunnel liners, Pennsylvania Turnpike Commission, to Carnegie-Illinois Steel Corp., Pittsburgh, through Arundel Corp., Baltimore, contractor.

1170 **Tons,** Grand Rapids, Mich., intake pipe, to National Tube Co., Pittsburgh, through Lyons Construction Co.

230 **Tons,** Omaha, Neb., redecking Dodge Street bridge, to Omaha Steel Works, Omaha.

180 **Tons,** Cleveland, Big Creek intercepting sewer, to Bethlehem Steel Co., Bethlehem, Pa., through Lombardo Bros. Construction Co., Cleveland.

SHEET PILING
AWARDS

1756 **Tons,** Los Angeles, H-bearing piles for United States Engineer, to Columbia Steel Co., San Francisco.

700 **Tons,** Chicago, section S4A, subway, to Bethlehem Steel Co., Bethlehem, Pa.

300 **Tons,** McHenry, Ill., dam, to an unnamed bidder.

300 **Tons,** Cleveland, Big Creek intercepting sewer, to Union Metal Mfg. Co., Canton, through Lombardo Bros. Construction Co., Cleveland.

270 **Tons,** Cleveland, Cuyahoga River straightening project; cut No. 3B, to Bethlehem Steel Co., Bethlehem, Pa., through L. A. Wells Construction Co.

PENDING PROJECTS

1200 **Tons,** Holyoke, Mass., dike.

250 **Tons,** San Francisco, Coast Guard air station; bids June 20.

REINFORCING STEEL
ATLANTIC STATES
AWARDS

900 **Tons,** Fulton County, Pa., section S2, Pennsylvania Turnpike Commission, to Carnegie-Illinois Steel Corp., Pittsburgh, through Arundel Corp., Baltimore, contractors.

700 **Tons,** Yonkers, N. Y., apartments, Municipal Housing Authority, to Bethlehem Steel Co., Bethlehem, Pa., through Esaty & Fuhrman, contractors.

600 **Tons,** Westmoreland County, Pa., section 3B, Pennsylvania Turnpike Commission, to Fort Pitt Bridge Works Co., Pittsburgh, through Edmonson & Ferguson, Inc., Pittsburgh, contractor.

577 **Tons,** Bedford County, Pa., section 13B, Pennsylvania Turnpike Commission, to Bethlehem Steel Co., Bethlehem, Pa., through York Engineering & Construction Co., contractor.

550 **Tons,** Springfield, Mass., sewage disposal plant, to Bethlehem Steel Co., Bethlehem, Pa., through Caye Construction Co., contractor.

400 **Tons,** Westmoreland County, Pa., sections 3A and 4C, Pennsylvania Turnpike Commission, to Fort Pitt Bridge Works Co., through Guthrie, Marsch & Peterson, Inc., contractor.

270 **Tons,** Snake Spring Township, Pa., section 13C, Pennsylvania Turnpike Commission, to Bethlehem Steel Co., through York Engineering & Construction Co., contractor.

200 **Tons,** Wilmington, Del., Nemours Foundation hospital, to Republic Steel Corp., Cleveland, through Concrete Steel Co.; George A. Fuller Co., contractor.

175 **Tons,** Pittsburgh, Negley Run sewer, to Jones & Laughlin Steel Corp., Pittsburgh, through Parkview Construction Co., contractor.

CENTRAL AND WESTERN STATES

1000 **Tons,** Louisville, Ky., housing development (colored), to Truscon Steel Co., Youngstown, through Struck Construction Co., contractor.

750 **Tons,** Cleveland, Valleyview housing project, to Patterson-Leitch Co., through Sam W. Emerson Co., Cleveland.

300 **Tons,** Akron, Ohio, Quaker Oats elevator, to Joseph T. Ryerson & Son, Inc., Chicago, through Alskog Co., contractor.

200 **Tons,** Decatur, Ill., A. E. Staley Mfg. Co., soy bean elevator, to Truscon Steel Co., through James Stewart, N. Y.

138 **Tons,** Salt Lake City, Veterans' building, to Soule Steel Co., Los Angeles, through J. S. Metzger & Son, Los Angeles.

130 **Tons,** San Francisco, Best Foods warehouse, to Ceco Steel Products Co., San Francisco.

100 **Tons,** Barberton, Ohio, bars, mesh and joist for Industrial Arts Building, to Bethlehem Steel Co., Bethlehem, Pa., through Charles Rulin.

PENDING REINFORCING BAR PROJECTS
ATLANTIC STATES

2000 **Tons,** Boston, Mass., New England Mutual Life Insurance Co., building.

1300 **Tons,** Holyoke, Mass., dike.

1000 **Tons,** Buffalo, Washburn-Crosby plant extension; bids June 12.

775 **Tons,** Quincy, Mass., Procter & Gamble soap factory.

263 **Tons,** Dutchess County, N. Y., highway project R.C. 4016; bids taken until June 28.

260 **Tons,** Winchester, Conn., bars and mesh, two State bridges.

250 **Tons,** Pittsburgh, Four Mile Run drainage basin; Mead Construction Co., contractor.

241 **Tons,** Schoharie County, N. Y., highway project R.C. 4022; bids close June 28.

225 **Tons,** Pittsburgh, contract No. 4, River Front Boulevard.

200 **Tons,** Hartford, Conn., dike.

133 **Tons,** Onondaga County, N. Y., highway project R.C. 2565; bids close June 28.

104 **Tons,** Orange County, N. Y., bars and mesh, highway project R. C. 4032; bids close June 28.

100 **Tons,** Thompson, Conn., State bridge.

CENTRAL AND WESTERN STATES

500 **Tons,** Chicago, soy bean elevator for Glidden Co.

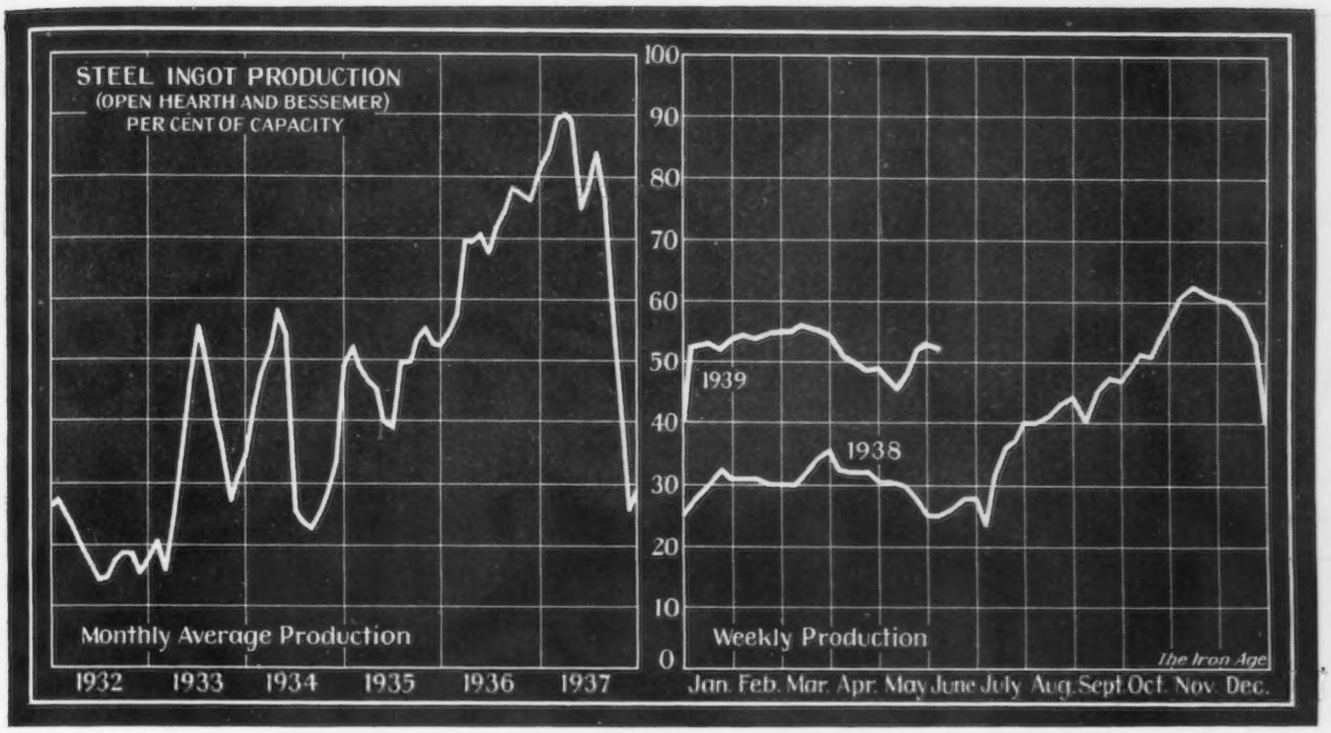
200 **Tons,** Saginaw, Mich., bridge and grade separation.

200 **Tons,** San Francisco, junior college gymnasium; bids June 16.

173 **Tons,** Akron, Ohio, rail steel bars for state bridge, new bids June 20. (Previously reported).

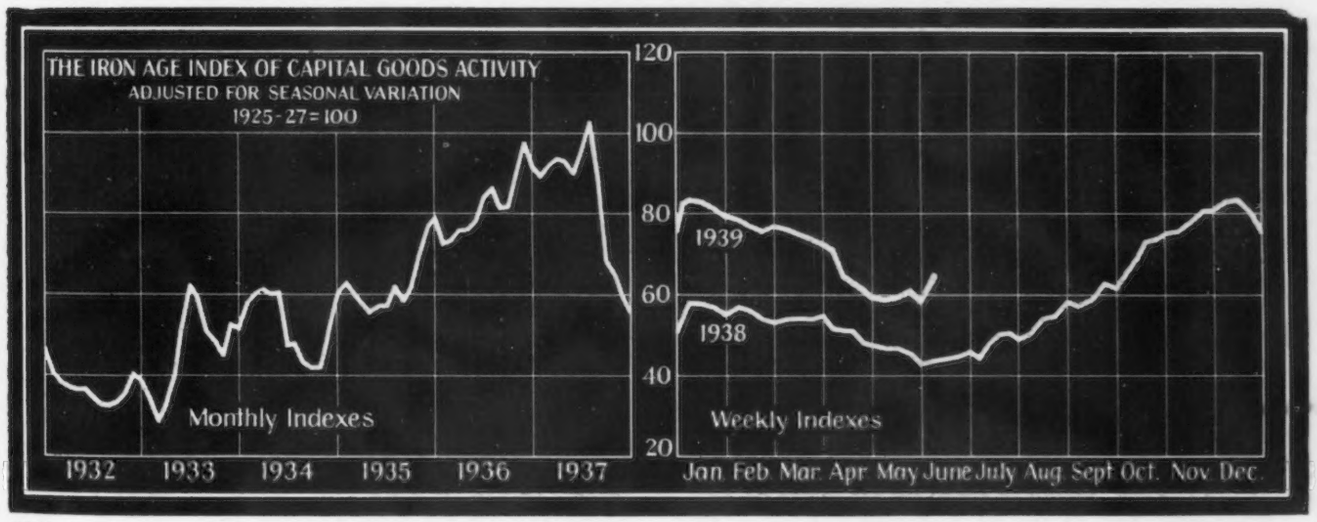
103 **Tons,** Oakland, Cal., Treasury Department, San Francisco (Invitation 1065); bids in.

Ingot Production Drops One-Half Point to 52½%



District Ingot Production, Per Cent of Capacity	Pitts-burgh	Chicago	Valleys	Phila-delphia	Cleve-land	Buffalo	Wheel-ing	Detroit	Southern	S. Ohio River	Western	St. Louis	East-ern	Aggre-gate
CURRENT WEEK..	40.0	49.5	51.0	35.0	53 0	44.5	77.0	55.0	55.5	61.0	54.0	44.0	50.0	**52.5**
PREVIOUS WEEK..	41.0	52.5	51.0	35.0	51.0	44.5	71.0	55.0	50.5	58.0	57.0	49.0	50.0	**53.0**

Capital Goods Activity Made Large Gains in Past Week



THE rate of operations in the capital goods industries, as measured by THE IRON AGE index, turned sharply upward in the past week and the index registered the heaviest gain of the past six months. At the end of the week the combined index number stood at 65.7, the highest point reached since April 8 and comparing with 57.9 in the preceding week. The week's improvement was general throughout the index. Steel output rose 4.1 points to 73.9, the highest since Feb. 25; automobile assemblies, recovering from the strike, moved up 23.8 points to 57.6, just four points below the index's position before the strike; lumber carloadings, despite the holiday week, gained 1.3 points to 54, and the heavy construction series moved up 4.4 points to 67.4. The gain in this latter component was largely due to a sudden spurt in the letting of a number of large private industrial contracts.

	Week Ended June 10	Week Ended June 3	Comparable Week 1938	Comparable Week 1929
Steel ingot production[1]	73.9	69.8	32.6	135.7
Automobile production[2]	57.6	33.8	36.0	127.9
Construction contracts[3]	74.7	70.2	57.8	128.0
Forest products carloadings[4]	54.0	52.7	48.5	113.6
Production and shipments, Pittsburgh District[5]	67.4	63.0	42.2	127.7
Combined index	**65.7**	**57.9**	**43.4**	**126.6**

Sources: 1. THE IRON AGE; 2. Ward's Automotive Reports; 3. *Engineering News-Record*; 4. Association of American Railroads; 5. University of Pittsburgh.

. . . SUMMARY OF THE WEEK . .

. . . Operations off slightly, but are expected to go higher.

° ° °

. . . Scrap price trend upward; composite gains 21c. to $14.79.

° ° °

. . . Building construction still mainstay of total steel demand.

ALTHOUGH steel ingot production this week has declined half a point to 52½ per cent of the industry's capacity, this slight change has no special significance, merely indicating that some plants have replenished their stocks of semi-finished steel, which were depleted during the coal crisis in early May.

No sharp decline in operations is expected in the near future. On the contrary, the rate probably will go up moderately, possibly to a peak of about 60 per cent during July and August, when much heavier shipments of sheets and strip against recent low-priced commitments will be made. In fact, it appears that the bulk of the production of this tonnage will come during the third quarter, when the automobile industry will be engaged in initial runs on 1940 models.

Some gains in steel operations have occurred this week, despite the reduction in the rate for the industry as a whole. The Wheeling-Weirton district is up six points to 77 per cent, the Cleveland-Lorain district has gained two points to 53 per cent, the Birmingham district is five points higher at 55½ per cent and the Southern Ohio River district has gained three points to 61 per cent. These are offset by losses in the Pittsburgh district, down one point to 40 per cent, the Chicago district, which is three points lower at 49½ per cent, and in the St. Louis and Western districts.

STEEL scrap prices, which sometimes give advance indications of the trend of steel production, are strong and are possibly headed higher. In some districts, notably Cleveland and Youngstown, there is a shortage of scrap which has forced dealers to go into the Pittsburgh district to supply Youngstown mills, an unusual situation. The Pittsburgh market is 50c. higher largely because of this outside demand. The Philadelphia market is also stronger as a result of continued export shipments. Only at Chicago are quotations lower, but that is a readjustment due to a mill purchase at $13.75, or 25c. a ton below last week's maximum quotation. THE IRON AGE scrap composite price has risen 21c. to $14.79, which is only 50c. below this year's peak figure of $15.29 in late March. The rise in the composite from its low point of the year is 71c. Last year in June the scrap market began a rapid advance which carried THE IRON AGE composite up $3.83 from its low point by Aug. 9, and during that period the steel ingot rate went up from 25 to 40 per cent.

Aside from sheets and strip, incoming tonnage is holding at a fairly steady volume. In the flat rolled products the specifications this month against blanket commitments are not so heavy as they were expected to be, and in many instances where specifications have been received buyers are requesting July and August shipment.

Building construction is still the mainstay of total steel demand, with tin plate also making a good showing at a steady 70 per cent production rate. Railroad buying is disappointing, the farm implement industry is beginning to taper off on seasonal production, and the orders from the oil industry, while slightly better, leave much room for improvement. It is the opinion of many in the steel trade that no one factor could contribute so much to a substantial improvement in steel business as a healthy revival of railroad equipment buying, which may be helped along if the Wheeler bill passes Congress and carloadings pursue an upward trend. A sharp increase in machine tool sales in May to an exceptionally high index figure of 219.8 would give greater satisfaction to the machine tool industry if it did not represent so large a portion of business stimulated by Government spending here and abroad and correspondingly little private investment.

Large tonnage awards of steel are infrequent except in the building field. However, an oil company has bought 8000 tons of 10-in. pipe for a 130-mile line in the Illinois field from the Youngstown Sheet & Tube Co. Fabricated structural steel lettings, at 17,500 tons, were smaller than in the preceding week, but new projects total nearly 26,000 tons, including 9000 tons for a bridge at Woodbridge, N. J., and 4500 tons for a municipal center administration building in Washington. One of the largest awards was 5400 tons for the Shore Road Parkway viaduct in Brooklyn. A Rockefeller Center building in New York will take 3600 tons.

A Comparison of Prices

Market Prices at Date, and One Week, One Month, and One Year Previous
Advances Over Past Week in Heavy Type, Declines in Italics

Rails and Semi-finished Steel

Per Gross Ton:	June 13, 1939	June 6, 1939	May 16, 1939	June 14, *1938
Rails, heavy, at mill	$40.00	$40.00	$40.00	$42.50
Light rails: Pittsburgh, Chicago, Birmingham	40.00	40.00	40.00	43.00
Rerolling billets: Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point.	34.00	34.00	34.00	37.00
Sheet bars: Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point	34.00	34.00	34.00	37.00
Slabs: Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point	34.00	34.00	34.00	37.00
Forging billets: Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham	40.00	40.00	40.00	43.00
Wire rods: Nos. 4 and 5, Pittsburgh, Chicago, Cleveland	43.00	43.00	43.00	47.00
Skelp, grvd. steel: Pittsburgh, Chicago, Youngstown, Coatesville, Sparrows Point, cents per lb.	1.90	1.90	1.90	2.10

Finished Steel

Cents Per Lb.:	June 13, 1939	June 6, 1939	May 16, 1939	June 14, *1938
Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham	2.15	2.15	2.15	2.45
Plates: Pittsburgh, Chicago, Gary, Birmingham, Sparrows Point, Cleveland, Youngstown, Coatesville, Claymont	2.10	2.10	2.10	2.25
Structural shapes: Pittsburgh, Chicago, Gary, Buffalo, Bethlehem, Birmingham	2.10	2.10	2.10	2.25
Cold finished bars: Pittsburgh, Buffalo, Cleveland, Chicago, Gary	2.65	2.65	2.70	2.90
Alloy bars: Pittsburgh, Chicago, Buffalo, Bethlehem, Massillon or Canton	2.70	2.70	2.70	3.00
Hot rolled strip: Pittsburgh, Chicago, Gary, Cleveland, Middletown, Youngstown, Birmingham	2.00	2.00	2.00	2.30
Cold rolled strip: Pittsburgh, Cleveland, Youngstown	2.80	2.80	2.80	3.10
Sheets, galv., No. 24: Pittsburgh, Gary, Sparrows Point, Buffalo, Middletown, Youngstown, Birmingham	3.50	3.50	3.30	3.65
Hot rolled sheets: Pittsburgh, Gary, Birmingham, Buffalo, Sparrows Point, Cleveland, Youngstown, Middletown	2.00	2.00	2.00	2.30
Cold rolled sheets: Pittsburgh, Gary, Buffalo, Youngstown, Cleveland, Middletown	3.05	3.05	3.05	3.35
Wire nails: Pittsburgh, Chicago, Cleveland, Birmingham	2.45	2.45	2.45	2.75
Plain wire: Pittsburgh, Chicago, Cleveland, Birmingham	2.60	2.60	2.60	2.90
Barbed wire, galv.: Pittsburgh, Chicago, Cleveland, Birmingham	†3.30	3.30	3.30	3.40
Tin plate, 100 lb. base box: Pittsburgh and Gary	$5.00	$5.00	$5.00	‡$5.35

*Pittsburgh prices only.
†Applies to 80-rod spools only.
‡Subject to post-season adjustment.

Pig Iron

Per Gross Ton:	June 13, 1939	June 6, 1939	May 16, 1939	June 14, *1938
No. 2 fdy., Philadelphia	$22.84	$22.84	$22.84	$25.84
No. 2, Valley furnace	21.00	21.00	21.00	24.00
No. 2, Southern Cin'ti	21.06	21.06	21.06	23.89
No. 2, Birmingham	17.38	17.38	17.38	20.38
No. 2, foundry, Chicago†	21.00	21.00	21.00	24.00
Basic, del'd eastern Pa.	22.34	22.34	22.34	25.34
Basic, Valley furnace	20.50	20.50	20.50	23.50
Malleable, Chicago†	21.00	21.00	21.00	24.00
Malleable, Valley	21.00	21.00	21.00	24.00
L. S. charcoal, Chicago	28.34	28.34	28.34	30.34
Ferromanganese, seab'd carlots	80.00	80.00	80.00	102.50

†The switching charge for delivery to foundries in the Chicago district is 60c. per ton.

Scrap

Per Gross Ton:	June 13, 1939	June 6, 1939	May 16, 1939	June 14, *1938
Heavy melting steel, P'gh	**$15.25**	$14.75	$14.25	$10.75
Heavy melting steel, Phila.	**15.50**	15.25	15.25	12.00
Heavy melting steel, Ch'go	*13.625*	13.75	12.75	10.25
Carwheels, Chicago	12.75	12.75	12.50	12.00
Carwheels, Philadelphia	16.00	16.00	16.00	14.75
No. 1 cast, Pittsburgh	15.25	15.25	15.25	13.25
No. 1 cast, Philadelphia	16.25	16.25	16.25	14.25
No. 1 cast, Ch'go (net ton)	12.25	12.25	11.75	10.25

Coke, Connellsville

Per Net Ton at Oven:	June 13, 1939	June 6, 1939	May 16, 1939	June 14, *1938
Furnace coke, prompt	$3.75	$3.75	$3.75	$3.75
Foundry coke, prompt	4.75	4.75	4.75	4.75

Non-Ferrous Metals

Cents per Lb. to Large Buyers:	June 13, 1939	June 6, 1939	May 16, 1939	June 14, *1938
Copper, electrolytic, Conn.	10.00	10.00	10.00	9.00
Copper, lake, New York	10.00	10.00	10.00	9.125
Tin (Straits), New York	*48.25*	48.75	48.875	38.70
Zinc, East St. Louis	4.50	4.50	4.50	4.00
Zinc, New York	4.89	4.89	4.80	4.39
Lead, St. Louis	4.60	4.60	4.60	3.85
Lead, New York	4.75	4.75	4.75	4.00
Antimony (Asiatic), N. Y.	14.00	14.00	14.00	14.00

On export business there are frequent variations from the above prices. Also in domestic business, there is at times a range of prices on various products, as shown in our detailed price tables.

The Iron Age Composite Prices

	Finished Steel	Pig Iron	Steel Scrap
June 13, 1939	2.236c. a Lb.	$20.61 a Gross Ton	$14.79 a Gross Ton
One week ago	2.236	20.61	14.58
One month ago	2.236	20.61	14.08
One year ago	2.487	23.25	11.00

Based on steel bars, beams, tank plates, wire, rails, black pipe, sheets and hot-rolled strip. These products represent 85 per cent of the United States output.

Based on average for basic iron at Valley furnace and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Southern iron at Cincinnati.

Based on No. 1 heavy melting steel quotations at Pittsburgh, Philadelphia and Chicago.

	Finished Steel High	Finished Steel Low	Pig Iron High	Pig Iron Low	Steel Scrap High	Steel Scrap Low
1939	2.286c., Jan. 3	2.236c., May 16			$15.29, Mar. 28	$14.08, May 16
1938	2.512c., May 17	2.211c., Oct. 18	$23.25, June 21	$19.61, July 6	15.00, Nov. 22	11.00, June 7
1937	2.512c., Mar. 9	2.249c., Jan. 4	23.25, Mar. 9	20.25, Feb. 16	21.92, Mar. 20	12.92, Nov. 10
1936	2.249c., Dec. 28	2.016c., Mar. 10	19.73, Nov. 24	18.73, Aug. 11	17.75, Dec. 21	12.67, June 9
1935	2.062c., Oct. 1	2.056c., Jan. 8	18.84, Nov. 5	17.83, May 14	13.42, Dec. 10	10.33, Apr. 29
1934	2.118c., Apr. 24	1.945c., Jan. 2	17.90, May 1	16.90, Jan. 27	13.00, Mar. 13	9.50, Sept. 25
1933	1.953c., Oct. 3	1.792c., May 2	16.90, Dec. 5	13.56, Jan. 3	12.25, Aug. 8	6.75, Jan. 3
1932	1.915c., Sept. 6	1.870c., Mar. 15	14.81, Jan. 5	13.56, Dec. 6	8.50, Jan. 12	6.43, July 5
1931	1.981c., Jan. 13	1.883c., Dec. 29	15.90, Jan. 6	14.79, Dec. 15	11.33, Jan. 6	8.50, Dec. 29
1930	2.192c., Jan. 7	1.962c., Dec. 9	18.21, Jan. 7	15.90, Dec. 16	15.00, Feb. 18	11.25, Dec. 9
1929	2.223c., Apr. 2	2.192c., Oct. 29	18.71, May 14	18.21, Dec. 17	17.58, Jan. 29	14.08, Dec. 3
1928	2.192c., Dec. 11	2.142c., July 10	18.59, Nov. 27	17.04, July 24	16.50, Dec. 31	13.08, July 9

. . . THIS WEEK'S MARKET NEWS . . .

PRICES

. . . Adjustments made on sheet and strip commitments . . . Plate prices weak

FURTHER adjustments on initial commitments covering low-priced sheet and strip business have been made throughout the industry during the past week. Competitive conditions have forced some tonnage which was originally placed at $4 and $6 below the market to be taken at $8 off the maximum concession prevalent early in May.

The hot rolled bar price situation continues as unsettled as ever but some sources in the trade still look for clarification before July 1 when a net increase of $1 a ton for large buyers is slated to go into effect.

Some adjustments are being made this month on the price of sheet bars for conversion into sheets and strip for shipments to non-integrated sheet makers.

Plate prices have been further unsettled by the recent break in sheet prices. The sales of heavy hot rolled sheets in gages close to light plates at $6 to $8 a ton below the base price for plates, added to the unsettlement that has been caused by the prolific use of fabrication-in-transit rates, leaves plate makers in a quandary as to possible developments. Some mills have been making concessions from their f. o. b. mill quotations in order to meet f. i. t. delivered prices from distant mills.

Third quarter bolt and nut price schedules are still indefinite at Cleveland. Rivet prices will be carried forward into third quarter unchanged.

STEEL OPERATIONS

. . . Ingot rate off a half point to 52% . . . No important change involved

STEEL ingot production for the industry as a whole has slid off half a point to 52½ per cent this week, but this slight change has no special significance.

During the tie-up of coal mines in early May many steel plants drew upon stocks of raw steel in order to conserve coal supplies, but after the coal settlement they began building up these stocks again, especially to have steel on hand for rush orders that may be received against recent commitments for sheets and strip. As some mills have readjusted their raw steel stocks to a normal basis, they have curtailed steel making to conform more closely to incoming orders.

At PITTSBURGH operations declined one point to 40 per cent, while at CHICAGO there was a loss of three points to 49½ per cent. There were also losses in the ST. LOUIS and WESTERN districts, but gains also were recorded, the WHEELING-WEIRTON district having gone up six points to 77 per cent, CLEVELAND-LORAIN up two points to 53 per cent, the BIRMINGHAM district up five points to 55½ per cent, and the SOUTHERN OHIO RIVER district up three points to 61 per cent. In the last named district the American Rolling Mill Co. is building up a stock of semi-finished steel to carry through July, when the installation of a new blooming mill at Middletown will result in the shutting down of the open-hearth department.

PIG IRON

. . . Orders booked for third quarter at unchanged prices

ALTHOUGH producers of merchant pig iron have issued no formal announcements of third quarter prices, some of them have booked orders for shipments in that period at unchanged prices.

The general picture of orders and shipments has changed very little in recent weeks. Production is gaining, however, but mostly in the steel-making grades. An additional furnace was blown in by the Tennessee Coal, Iron & Railroad Co., at Birmingham, last week, making 13 furnaces now active in that district.

Shipments this month may show a loss from May in some areas, particularly CHICAGO and ST. LOUIS, partly due to a slowing down in the agricultural implement industry. Illinois stove makers report that advance orders for fall delivery have been disappointing.

At public auction recently 152 tons of No. 2 iron and 638 tons of basic iron from the stock pile of the Colonial Iron Co., Riddlesburg, Pa., were sold. The No. 2 plain iron went to one buyer at $17.50 f.o.b. cars at Riddlesburg, while one lot of 91 tons of basic at $15 and one of 547 tons at $16.30 per ton, f.o.b. cars, Riddlesburg, went to another buyer. The purchaser of these two last lots also purchased 5665 tons of ore.

Present prices on ferromanganese were reaffirmed Monday for third quarter business. The Ford Motor Co. has issued an inquiry for its third quarter needs. Under normal conditions, the company's requirements average about 400 tons per month.

NEW BUSINESS

. . . Improvement is slow and spotty . . . Shipments gaining

TOTAL specifications in PITTSBURGH so far this month are running from 20 to 30 per cent ahead of a month ago, but this showing is not as impressive as appears on the surface. In the first place, mill order books during the early part of May were affected to some extent by the coal strike, and in the second place, a substantial amount of flat rolled specifications against low-priced commitments made in May were recorded. Specifications against May sheet and strip commitments within the past week have not been coming in at anywhere near the rate expected by the trade. It is believed that because of this and because of the general business situation, constant pressure will have to be exerted by the mills in order to obtain shipping releases on flat rolled business.

New business is far behind that of May in CHICAGO since it was at this time last month that the price war in sheets and strip was beginning. Very litt'e new interest is being shown in flat rolled products today. Releases against low-priced orders placed last month are coming in, however, and considerable activity from this source is expected late this month and in July and August when work gets under way on 1940 automobiles.

Structural fabricators around CHICAGO are only moderately busy but suppliers of reinforcing steel are enjoying a burst of business which is expected to carry through the summer.

Pig iron shipments this month will show a decline from May, which may be sharp, but a pickup is expected during July and August. Some farm equipment plants will shut down the last part of this month for vacations and inventories which probably will last until the July 4 holiday.

At CLEVELAND during the first 10 days of June new orders, including releases against blanket sheet and strip steel contracts, were comparable with those received in the first 10 days of May. Some producers report orders approximately 10 per cent ahead of the May period and others about 10 per cent behind. Shipments this month at CLEVELAND, however, are up more sharply, the gains ranging around 20 per cent.

Excepting flat-rolled products, new business in the PHILADELPHIA area is unchanged from recent levels. Tin plate and reinforcing bar sales account for the bulk of current activity there, while pipe is seasonally dull and hot rolled bar demand is nil, except for occasional purchases by warehouses. With practically every user of flat rolled products covered well through the third quarter, and in some cases into the fourth quarter, little new business of this nature is expected until close to the new year.

In the NEW YORK district building activity is accounting for a good share of incoming tonnage. Specifications against recent low-priced commitments for sheets and strip are coming in slowly, and it appears that the bulk of the shipments will be made during the third quarter.

SEMI-FINISHED STEEL

. . . Concessions of $4 granted on sheet bars to non-integrated mills

TOTAL semi-finished sales in the past week have stepped up slightly, part of the increase being due to better activity on the part of non-integrated sheet mills. Orders so far this month, however, are not much if any greater than the corresponding period last month. Shipments are not expected to turn downward, however, for some time, owing to requirements which will move to non-integrated sheet makers during the next several months. Non-integrated sheet makers are being covered the rest of this month at $4 a ton off the published price for sheet bars which are to be converted into sheets and strip. This action in part compensates for the decline in sheet and strip prices last month. It is understood that other semi-finished steel prices are not affected in this adjustment.

Failure of sheet bar orders to improve sharply at CLEVELAND and YOUNGSTOWN appears to indicate that some non-integrated mills are slow in obtaining releases for sheets from their customers. Demand for forging items remains fair.

IRON ORE

. . . Two lots sold at auction at Riddlesburg, Pa.

TWO lots of iron ore, totaling 5665 tons, from the stock pile of the Colonial Iron Co., Riddlesburg, Pa., were sold at auction recently. One lot of 2185 tons went at $3.05 per gross ton, f.o.b. cars, Riddlesburg, and the other, amounting to 3480 tons, went at $2.35 per gross ton. The former lot analyzed 59.25 per cent Fe, and the latter 54.75 per cent.

REINFORCING BARS

. . . Awards and inquiries are in fairly good volume

THERE continues to be a fairly good volume of activity in reinforcing bars. Outstanding among new projects that have come out for bids are 2000 tons for the New England Mutual Life Insurance Co. building in Boston; 1300 tons for a dike at Holyoke, Mass., and 1000 tons for an extension of the Washburn-Crosby flour mill at Buffalo.

Awards include 1000 tons for a housing development for colored people at Louisville, Ky., which went to the Truscon Steel Co.; 1000 tons for sections of the Pennsylvania Turnpike in Westmoreland County, to be furnished by Fort Pitt Bridge Co.; 900 tons for the same turnpike to be furnished by the Carnegie-Illinois Steel Corp.; 750 tons for a housing project in CLEVELAND, placed with the Paterson-Leitch Co.

A large volume of work remains on the pending list in the CHICAGO district, and prospects are good there for a continued high rate of activity throughout the summer. The largest single jobs are various sections of the CHICAGO subway, with bids to be taken June 29 on one lot of 3750 tons.

Concessions are prevalent in some areas. For example, in PHILADELPHIA recently these have amounted from $10 to $13 a ton on important jobs.

STRUCTURAL STEEL

. . . New business climbs; awards show moderate decline

NEW projects the past week gained sharply to 25,800 tons, compared with 7800 the previous week, while awards declined from 21,900 to 17,500 tons. Among the sizable awards were 5400 tons for the Shore Parkway viaduct, Coney Island, New York, to American Bridge Co.; 4000 tons for section S-7 of the Chicago subway, to Carnegie-Illinois Steel Corp., and 3600 tons of material for a Rockefeller Center building, New York, to Bethlehem Steel Co.

New business includes 9200 tons for a Raritan River bridge at Woodbridge, N. J.; 4500 tons for a municipal center administration building at Washington, and 2235 tons for gates on the Marshall Ford dam at Rutledge, Tex.

Specifications at PITTSBURGH have stepped up somewhat in the past week and are beginning to reflect the increase in awards noted several weeks ago. No large jobs can be seen in the CHICAGO area, with Illinois and Wisconsin bridge lettings and CHICAGO public school construction the most promising.

Columbia Steel Co. will furnish 1756 tons of H-type bearing piles awarded by the United States Engineer, Los Angeles. American Bridge Co. is low bidder on 850 tons for roof framing for the Grand Coulee power house.

MERCHANT BARS

. . . Trade still confused by price situation . . . Buying moderate

HOT rolled bar sales at PITTSBURGH in the past week fluctuated but little from previous weekly averages. Large bar buyers are taking their time in placing business before the $1 advance is slated to go into effect July 1. Meanwhile, the confusion over the proposed mark-up in price for the large bar buyers still exists and some parts of the trade continue to look for clarification before the first of the month.

Speculative coverage at CLEVELAND and YOUNGSTOWN is smaller than anticipated, consumers apparently ordering only bars which they can see their way clear to use. Despite sellers' strenuous efforts to explain the current price situation clearly, confusion among buyers has increased.

Production of tractors, both farm and industrial, which has provided

CHICAGO steel mills with considerable bar business for some time, is leveling off, though in some cases increases have been caused by depleted stocks. Farm equipment makers are only moderately active. Jobbers and forgers continue among the best bar buyers in the CHICAGO market.

TUBULAR GOODS

. . . Sheet & Tube books 8000 tons for Texas Corp. line

THE line pipe market is headed by the award of approximately 8000 tons to Youngstown Sheet & Tube Co., by Texas Corp. This line will serve the Illinois field and consists of approximately 100 miles of light wall and 30 miles of heavy wall electric weld 10-in. pipe. At CLEVELAND orders for short connecting lines, each consisting of up to 200 tons of pipe, have been numerous recently.

Oil-country specification at PITTSBURGH have increased a shade recently but total business on this product continues unsatisfactory. Merchant pipe, owing to better building activity, is moving at a faster clip than a month ago. Irregularities in the secondary market for merchant pipe persist in some areas.

PLATES

. . . Price situation confused by low-priced sheets and f. i. t. deals

THE recent break in sheet prices, together with the upsetting effect on the market of fabrication-in-transit deals, has led some buyers to believe that some kind of a price adjustment may occur on plates.

There is nothing new in the fabrication-in-transit situation itself except that some mills which cannot quote on an f. i. t. basis to nearby customers are offering concessions from the base price in order to meet the competition of more distant mills. These concessions sometimes amount to $2 or $3 a ton.

The fact that sheets were recently sold at $6 to $8 a ton below the base price for plates has made the price comparison between heavy gage sheets and light gage plates an exceedingly difficult problem for plate makers.

The volume of going plate business is small and competition is thereby intensified. Around NEW YORK the principal activity is among tank builders, although there is a good flow of orders for shipbuilding, while at CHICAGO the Milwaukee road's car building program is responsible for most of the life in the plate market there. At CLEVELAND activity centers around specifications against previously awarded contracts. The National Tube Co. has been awarded 1170 tons for a Grand Rapids, Mich., intake line by the contractor, the Lyons Construction Co.

A considerable volume of plates is required for 11 drum gates for the spillway at Grand Coulee Dam, on which bids will be opened July 12. The job calls for 7000 tons of shapes and plates.

The Carnegie-Illinois Steel Corp. was awarded 4000 tons through M. J. Boyle, CHICAGO contractor, for tunnel liners for the CHICAGO subway, and 2000 tons, through the Arundel Corp., Baltimore, for tunnel liners for the Pennsylvania Turnpike.

RAILROAD BUYING

. . . Lehigh & New England buys 50 hopper cars

EQUIPMENT purchases in the past week include 50 covered hopper cars from American Car & Foundry Co. by Lehigh & New England, 10 hopper cars from Pullman-Standard Car Mfg. Co. by Aluminum Co. of America, and four dump cars from Pressed Steel Car Co. by Republic Steel Corp.

The Pennsylvania Railroad will build 25 additional 21,000-gal. locomotive tenders at Altoona, Pa. The new tenders will supplement an equal number of similar description and capacity which were authorized late last year and the construction of which has nearly been completed.

Kansas, Oklahoma & Gulf Railway has purchased 3200 gross tons of rails from Carnegie-Illinois Steel Corp.

WIRE PRODUCTS

. . . Market awaiting support from automotive buying

SALES of merchant wire products and manufacturers' wire have leveled off in the past week and the volume of business so far this month is below that booked in the corresponding period last month. Wire fence sales are holding up fairly well but the entire wire market appears to be awaiting support from farm buying and automotive requirements for 1940 models. The realized price on nails has greatly improved recently.

Farm buying continues in the spotlight in the CHICAGO territory. Production on 1940 motor cars will stimulate manufacturers' wire demand next month and into August. A slackening in rural interest probably will be seen late this month.

TIN PLATE

. . . Operations steady at 70% of capacity

TIN plate operations remain virtually unchanged at 70 per cent, with releases slightly stronger than a few weeks ago. Although sanitary can makers are close to the maximum point of activity, general line can demand is holding up exceptionally well. This good showing in tin plate releases is all the more interesting when it is realized that can makers are under no compulsion to take anything except necessary material, since third quarter prices are identical with those which prevailed during the first and second quarter.

SHEETS AND STRIP

. . . Specifications coming in slowly against recent commitments

SHEET and strip specifications at PITTSBURGH during the past week were up somewhat over the previous period but specifications against recent low-priced commitments are not coming in at a rate satisfactory to producers. As a result, all formal details and shipping data on low priced commitments will undoubtedly be finished at a later date than steel producers had hoped for. Meanwhile, an investigation of rumors current during the past 10 days that renewed price cutting had broken out discloses that this was in reality readjustments being made on some initial commitments. Competitive situations had arisen where consumers were offered the maximum $8 off the base price after they had placed business at prices ranging from $4 to $6 off the base. The result has been that many of these $4 and $6 concessions have had to be adjusted to meet the maximum concession of $8. Present published price on sheets and strip, obviously, remains untested.

At CLEVELAND this market has become very quiet, except for discussions surrounding releases and deliveries. Fast shipments are sought by some consumers on carloads but in

other instances mills must press for instructions. Galvanized material in combination cars with wire and nails is moving fairly well. Otherwise the galvanized market is quiet.

No buying of any consequence has been reported in the CHICAGO market. Releases probably will not become heavy against bookings at the low prices for another two weeks.

BOLTS, NUTS AND RIVETS

. . . No announcement issued yet on third quarter prices

THIRD quarter bolt and nut price schedules are still indefinite. Current prices are low on these items and principal producers are quoting just for the balance of June. The jobber market continues quiet despite the 5 per cent concession effective during June and despite the fact that jobber stocks are low.

. . . CANADA . . .

. . . Steel buying mostly in small lots

TORONTO, June 13—Small lot buying features business in the Canadian iron and steel markets, with total volume fairly good. Principal demand is for sheets and bars.

Merchant pig iron sales are slow.

SWOC Pay Demands Close Two Plants

BOSTON—A strike called by the C. I. O.'s Steel Workers' Organizing Committee last week forced the two plants of the American Screw Co., Providence, R. I., to close, throwing 700 workers out. The union demanded a wage increase of 10c. per hr. and two weeks' vacation with pay. Management contended business conditions were such these demands can not be met.

PRODUCTION OF OPEN-HEARTH AND BESSEMER STEEL INGOTS
(Reported by Companies Which in 1936 Made 98.67 Per Cent of the Open-Hearth and 100 Per Cent of the Bessemer Ingot Production)

	Reported Production (Gross Tons)		Calculated Production All Companies		Number of	Per Cent of Capacity
1938	Open-Hearth	Bessemer	Monthly	Weekly	Weeks	
January	1,612,469	99,941	1,734,165	391,459	4.43	29.17
February	1,551,082	125,443	1,697,452	424,363	4.00	31.63
March	1,821,935	157,687	2,004,204	452,416	4.43	33.72
1st Quarter	4,985,486	383,071	5,435,821	422,692	12.86	31.50
April	1,763,154	131,594	1,919,042	447,329	4.29	33.34
May	1,647,231	130,540	1,800,877	406,519	4.43	30.30
June	1,493,564	118,638	1,632,843	380,616	4.29	28.36
2nd Quarter	4,903,949	380,772	5,352,762	411,434	13.01	30.66
1st 6 Months	9,889,435	763,843	10,788,583	417,031	25.87	31.08
July	1,821,740	127,932	1,974,317	446,678	4.42	33.23
August	2,309,207	196,739	2,537,102	572,709	4.43	42.68
September	2,407,707	206,937	2,647,129	618,488	4.28	46.09
3rd Quarter	6,538,654	531,608	7,158,548	545,205	13.13	40.63
9 Months	16,428,089	1,295,451	17,947,131	460,183	39.00	34.29
October	2,844,450	223,158	3,105,985	701,125	4.43	52.25
November	3,312,475	201,196	3,558,363	829,455	4.29	61.81
December	2,932,272	158,912	3,130,746	708,314	4.42	52.79
4th Quarter	9,089,197	583,266	9,795,094	745,441	13.14	55.55
Total	25,517,286	1,878,717	27,742,225	532,072	52.14	39.65
1939						
January	2,986,455	147,494	3,216,653	726,107	4.43	53.18
February	2,710,696	196,186	2,982,011	745,503	4.00	54.60
March	3,115,022	194,694	3,396,021	766,596	4.43	56.14
1st Quarter	8,812,173	538,374	9,594,685	746,087	12.86	54.64
April	2,706,199	205,771	2,896,985	696,267	4.29	50.99
May	2,673,641	170,156	2,917,876	658,663	4.43	48.24

Figures for 1938 and January through March, 1939, have been revised.

May Steel Ingot Production At Low Point of the Year

STEEL ingot production in May, averaging only 48.24 per cent, was at the low point of the year thus far, the curtailment having been largely the result of the coal situation early in that month. Calculated output for the month was 2,917,876 gross tons compared with 2,986,985 tons in April. The weekly average last month was 658,663 tons compared with 696,267 tons in April.

In the five months of 1939 the steel industry has operated at an average of 52.63 per cent and has produced 15,499,546 gross tons of ingots.

Machine Tool Index Soars During May

CLEVELAND—The index of machine tool orders compiled by the National Machine Tool Builders' Association, Cleveland, rose sharply during May to 219.8 against 155.6 for April, and only 66.7 for May last year.

Both domestic and foreign orders improved last month. The association interprets the rise as indicative of underlying strength in business and the expectation of improvement.

The latest figure is the highest since April, 1937, when the index stood at 282.5. In May and August of that year gross orders rose over the 200 mark, but for the balance of that year the decline was swift.

The new three months' average is 186.9 against 169.4 at the April report. In May, 1938, the three months' average stood at 88.0.

Domestic orders particularly have played a prominent part in the gradual improvement of machine tool orders since last October. With the exception of April, gains have been uninterrupted each month.

Weekly Bookings of Construction Steel

	Week Ended				Year to Date	
	June 13, 1939	June 6, 1939	May 16, 1938	June 14, 1938	1939	1938
Fabricated structural steel awards	17,500	21,900	10,350	22,500	477,075	319,950
Fabricated plate awards	14,580	2,990	880	660	89,575	62,500
Steel sheet piling awards	3,325	175	665	0	76,905	14,150
Reinforcing bar awards	7,000	7,800	8,800	5,025	221,995	103,145
Total Letting of Construction Steel	42,405	32,865	20,695	28,185	815,550	499,745

IRON AND STEEL SCRAP

. . . Gains at Pittsburgh and Philadelphia offset small loss at Chicago . . . Composite up 21c. to $14.79.

JUNE 13—Recent consumer sales of moderate tonnages warrant an increase of 50c. a ton in the principal steel melting grades at Pittsburgh, but part of the strength there is derived from outside sources, principally mills in the Valley. At the latter point a shortage exists, and the difficulty in covering orders has resulted in a 25c. increase all along the line at Youngstown. Similar increases have taken place at Cleveland, where steady mill buying is reported. At Philadelphia, competition for export supplies has made No. 1 steel quotable at a flat $15.50 for domestic consumption, raising the average 25c. from last week. At Chicago, on the other hand, a slight decline in the average for No. 1 steel is recorded, because a substantial mill sale was made at $13.75, down 25c. from the high paid last week for a small lot. Nevertheless, brokers are not able to pick up No. 1 for less than $13.50, so that the situation could hardly be termed weak. As a result of these changes, the composite price for No. 1 steel has advanced 21c. to $14.79, from $14.58 the week before. Little activity is taking place in other markets, with the exception of the sale of 3000 tons of No. 2 steel at St. Louis.

Export shipments are heavy at Atlantic ports, the bulk of the tonnages going to England. Italy and other Continental countries are holding back on recent commitments, and there have been some holdups on recent Japanese business.

Pittsburgh

A moderate sized tonnage of No. 1 heavy melting has been sold in the Pittsburgh district during the past few days at $15 a ton while a smaller sale into consumption has brought $15.50 a ton. Brokers are offering $14.75 but are not having much success and in some cases have had to pay $15 for No. 1 steel. Meanwhile, other consuming points in the Pittsburgh district are paying between $15 and $15.50 for No. 1 steel and this grade is now quotable at $15 to $15.50, up 50c. from last week. The unusual situation whereby scrap is moving out of the Pittsburgh district into the Youngstown district, where a substantial shortage exists, continues. In fact, part of the strength in the Pittsburgh district is derived from the heavy requirements on the outside, as the total volume of transactions in the local district are not involving large tonnages. No. 1 bundles are reported to have brought $16 a ton into consumption recently.

Chicago

Close on the heels of last week's $14 sale, a large tonnage was purchased at $13.75 by the district's leading independent mill. Some of this material was on tracks outside the mill and obviously was distress scrap but the greater portion was purchased direct from brokers. It is necessary to pay $13.50 today for heavy melting steel and $13.75 is heard in a few instances. Since it is impossible to obtain tonnages of steel for less than $13.50, No. 1 is quoted this week at $13.50 to $13.75. Reductions of 25c. were made in the most open-hearth grades.

Philadelphia

The press of demands for steel melting grades for export continues to buoy the market here, despite the lack of any important domestic buying. This export demand, combined with fairly limited supplies, has made it practically impossible to secure material for domestic use at under $15.50 for No. 1 heavy melting and $13.50 for No. 2. In the past week moderate tonnages of both these grades were sold into domestic consumption at these prices. On the basis of this activity, and the firm undertone which prevails with respect to the steel making grades, quotations on No. 1 have been advanced 50c. to a flat $15.50 and No. 2 a similar amount to $13.50. Demand for cast items is not very active, while prices on specialties are essentially nominal in the absence of buying. Three boats are loading this week at Port Richmond and if the present pace is maintained throughout the balance of the month, June export loadings here will likely to exceed 30,000 tons, establishing a new record.

Youngstown

Difficulty in covering orders has been pronounced here recently, forcing buying prices higher. No. 1 heavy melting steel is now quoted at $15 to $15.50 per gross ton, an advance of 25c. This is considered only a modest increase. Some buyers are frank to state that they entertain little hope of purchasing No. 1 steel below $16 a ton in the Valley. Other grades are up correspondingly this week.

Cleveland

Quotations continue to rise here, No. 1 heavy melting steel being quoted up 25c. per ton to a range of $14 to $14.50 this week. Due to the greatly improved demand by mills, available supplies are none too heavy and some dealers are reluctant to sell freely. Wherever possible one mill is renewing its orders regularly as old orders expire. It is understood the majority of the Lake Shore Electric rails, approximately 20,000 tons, will be rerolled in this district, the entire tonnage having been purchased recently.

Buffalo

In addition to an already total suspension of shipments at one mill another large buyer of scrap in the district this week put partial restrictions into force. The market is very quiet and no new sales have been reported. Cast grades are not active. Although increasing strength is noted in other markets, none is as yet apparent here.

St. Louis

A district mill bought 3000 tons of No. 2 heavy melting steel, which was the only activity in a dull week. While no new deals are pending, shipments on old contracts are well sustained. Commercial yard stocks are reported light. The market is nominally unchanged. Railroad lists: Louisville & Nashville, 4200 tons; St. Louis, San Francisco, 1000 tons; and Gulf Coast Lines, 700 tons.

Cincinnati

Noticeable interest on the part of mills in old materials and an increase in movement on old contracts strengthened the local scrap market and brought dealer's bids up 50c. over the preceding week. Mills are paying better prices on current shipments and dealers are bidding aggressively for available materials. Of course, since mills in this area have continuing contracts, no new commitments are reported, shipments for virtually all types of steel material are better.

Detroit

Prices continue a sidewise movement in Detroit with little activity expected until the end of the month when new automotive lists are released for bids. The only offering of scrap currently is the list to be bid at Fisher Body this Thursday, June 15. Strong optimism on the part of the dealers is expected to sustain prices even though buying is negligible. Foundry activity has eased up somewhat, consequently, there is a tendency to softness in cast iron scrap.

New York

Great Britain is the only country of the European cartel group that is taking its recent commitments freely. Shipments to Italy are particularly restricted. The British accounted for over half of the recent large orders, however. The Japanese have also held up some shipments on the latest commitments owing to credit difficulties.

Boston

The price situation so far as domestic deliveries are concerned is somewhat mixed. The market for Nos. 1 and 2 steel is firmer because of the advance in prices in the Pittsburgh territory, and the price on bundled skeleton for Weirton consumption is 50c. a ton higher. On the other hand, the best price offered by the Weirton consumer for steel turnings is $2.38 a ton on cars, while all brokers will pay for breakable cast is $9.40 a ton, these two prices representing a downward adjustment from previous bids.

Toronto

Uncertainty as to sales and prices again featured the Canadian scrap markets for the week. While local dealers look for early strength in price lists, quotations for the past week were irregular with some softness. Stove plate was the only change in the list dropping $1 to $9 per ton in the Toronto area and to $8.50 at Montreal. Steel mills continue to show interest in steel materials and there is fair movement to the Hamilton districts in heavy melting steel although large consumers still are holding to short term contracts. Foundries are taking iron scrap in small tonnage lots. Dealers report extensive delivery of scrap into their yards, particularly machinery cast grades.

Iron and Steel Scrap Prices

PITTSBURGH

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel	$15.00 to $15.50
Railroad hvy. mltng.	16.00 to 16.50
No. 2 hvy. mltng. steel	13.75 to 14.25
Scrap rails	16.00 to 16.50
Rails 3 ft. and under	17.50 to 18.00
Comp. sheet steel	15.00 to 15.50
Hand bundled sheets	14.00 to 14.50
Hvy. steel axle turn.	13.50 to 14.00
Machine shop turn.	9.00 to 9.50
Short shov. turn.	9.50 to 10.00
Mixed bor. & turn.	6.50 to 7.00
Cast iron borings	6.50 to 7.00
Cast iron carwheels	14.50 to 15.00
Hvy. breakable cast	12.50 to 13.00
No. 1 cupola cast	15.00 to 15.50
RR. knuckles & cplrs.	17.50 to 18.00
Rail coil & leaf springs	18.00 to 18.50
Rolled steel wheels	18.00 to 18.50
Low phos. billet crops	18.50 to 19.00
Low phos. punchings	17.00 to 17.50
Low phos. plate	16.00 to 17.00

PHILADELPHIA

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel	$15.50
No. 2 hvy. mltng. steel	13.50
Hydraulic bund., new	14.50 to 15.00
Hydraulic bund., old	11.00 to 11.50
Steel rails for rolling	17.00 to 17.50
Cast iron carwheels	16.00
Hvy. breakable cast	14.50 to 15.00
No. 1 cast	16.00 to 16.50
Stove plate (steel wks.)	12.50 to 13.00
Railroad malleable	15.50 to 16.00
Machine shop turn.	8.00 to 8.50
No. 1 blast furnace	6.50 to 7.00
Cast borings	6.50 to 7.00
Heavy axle turnings	10.00 to 10.50
No. 1 low phos. hvy.	17.00 to 17.50
Couplers & knuckles	17.00 to 17.50
Rolled steel wheels	17.00 to 17.50
Steel axles	20.00 to 20.50
Shafting	20.50 to 21.00
Spec. iron & steel pipe	12.00 to 12.50
No. 1 forge fire	12.00 to 12.50
Cast borings (chem.)	9.50 to 10.00

CHICAGO

Delivered to Chicago district consumers:

	Per Gross Ton
Hvy. mltng. steel	$13.50 to $13.75
Auto. hvy. mltng. steel alloy free	11.75 to 12.25
No. 2 auto steel	10.25 to 10.75
Shoveling steel	13.50 to 13.75
Factory bundles	12.25 to 12.75
Dealers' bundles	11.25 to 11.75
Drop forge flashings	9.25 to 9.75
No. 1 busheling	11.75 to 12.25
No. 2 busheling, old	5.25 to 5.75
Rolled carwheels	14.50 to 15.00
Railroad tires, cut	15.00 to 15.50
Railroad leaf springs	14.50 to 15.00
Steel coup. & knuckles	14.25 to 14.75
Axle turnings	12.50 to 13.00
Coil springs	16.50 to 17.00
Axle turn. (elec.)	13.50 to 14.00
Low phos. punchings	15.50 to 16.00
Low phos. plates 12 in. and under	15.00 to 15.50
Cast iron borings	6.50 to 7.00
Short shov. turn.	6.50 to 7.00
Machine shop turn.	6.50 to 7.00
Rerolling rails	18.00 to 18.50
Steel rails under 3 ft.	16.00 to 16.50
Steel rails under 2 ft.	16.50 to 17.00
Angle bars, steel	15.25 to 15.75
Cast iron carwheels	12.50 to 13.00
Railroad malleable	15.00 to 15.50
Agric. malleable	12.00 to 12.50

	Per Net Ton
Iron car axles	$18.00 to $18.50
Steel car axles	17.50 to 18.00
Locomotive tires	13.00 to 13.50
Pipes and flues	8.50 to 9.00
No. 1 machinery cast	12.00 to 12.50
Clean auto. cast	12.50 to 13.00
No. 1 railroad cast	11.00 to 11.50
No. 1 agric. cast	10.00 to 10.50
Stove plate	7.75 to 8.25
Grate bars	7.75 to 8.25
Brake shoes	9.50 to 10.00

YOUNGSTOWN

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel	$15.00 to $15.50
No. 2 hvy. mltng. steel	14.00 to 14.50
Low phos. plate	16.25 to 16.75
No. 1 busheling	14.25 to 14.75
Hydraulic bundles	14.50 to 15.00
Machine shop turn.	9.00 to 9.50

CLEVELAND

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel	$14.00 to $14.50
No. 2 hvy. mltng. steel	13.00 to 13.50
Comp. sheet steel	13.50 to 14.00
Light bund. stampings	9.75 to 10.25
Drop forge flashings	11.50 to 12.00
Machine shop turn.	7.50 to 8.00
Short shov. turn.	8.00 to 8.50
No. 1 busheling	13.00 to 13.50
Steel axle turnings	10.50 to 11.00
Low phos. billet and bloom crops	17.50 to 18.00
Cast iron borings	8.00 to 8.50
Mixed bor. & turn.	8.00 to 8.50
No. 2 busheling	8.25 to 8.75
No. 1 cupola cast	15.50 to 16.00
Railroad grate bars	11.00 to 11.50
Stove plate	9.00 to 9.50
Rails under 3 ft.	17.75 to 18.25
Rails for rolling	17.50 to 18.00
Railroad malleable	15.00 to 15.50
Cast iron carwheels	13.50 to 14.00

BUFFALO

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel	$13.00 to $13.50
Railroad hvy. mltng.	13.50 to 14.00
No. 2 hvy. mltng. steel	11.00 to 11.50
Scrap rails	13.50 to 14.00
New hvy. b'ndled sheets	11.00 to 11.50
Old hydraul. bundles	10.00 to 10.50
Drop forge flashings	11.00 to 11.50
No. 1 busheling	11.00 to 11.50
Machine shop turn.	6.00 to 6.50
Knuckles & couplers	15.00 to 15.50
Coil & leaf springs	15.00 to 15.50
Rolled steel wheels	15.00 to 15.50
Shov. turnings	7.00 to 7.50
Mixed bor. & turn.	7.00 to 7.50
Cast iron borings	7.00 to 7.50
No. 1 machinery cast	15.00 to 16.00
No. 1 cupola cast	14.50 to 15.00
Stove plate	13.00 to 13.50
Steel rails under 3 ft.	18.00 to 18.50
Cast iron carwheels	13.50 to 14.00
Railroad malleable	15.00 to 15.50

ST. LOUIS

Dealers' buying prices per gross ton delivered to consumer:

Selected hvy. melting	$11.75 to $12.25
No. 1 hvy. melting	11.50 to 12.00
No. 2 hvy. melting	10.50 to 11.00
No. 1 locomotive tires	12.25 to 12.75
Misc. stand. sec. rails	13.00 to 13.50
Railroad springs	14.00 to 14.50
Bundled sheets	7.00 to 7.50
No. 1 busheling	7.50 to 8.00
Cast. bor. & turn.	2.50 to 3.00
Machine shop turn.	3.50 to 4.00
Heavy turnings	9.00 to 9.50
Rails for rolling	16.00 to 16.50
Steel car axles	17.00 to 17.50
No. 1 RR. wrought	9.75 to 10.25
No. 2 RR. wrought	11.50 to 12.00
Steel rails under 3 ft.	16.00 to 16.50
Steel angle bars	13.00 to 13.50
Cast iron carwheels	14.00 to 14.50
No. 1 machinery cast	14.50 to 15.00
Railroad malleable	12.00 to 12.50
No. 1 railroad cast	12.00 to 12.50
Stove plate	7.50 to 8.00
Grate bars	8.50 to 9.00
Brake shoes	9.50 to 10.00

CINCINNATI

Dealers' buying prices per gross ton at yards:

No. 1 hvy. mltng. steel	$11.00 to $11.50
No. 2 hvy. mltng. steel	8.75 to 9.25
Scrap rails for mltng.	14.50 to 15.00
Loose sheet clippings	6.50 to 7.00
Hydru. b'ndled sheets	10.50 to 11.00
Cast iron borings	3.25 to 3.75
Machine shop turn.	4.50 to 5.00
No. 1 busheling	7.25 to 7.75
No. 2 busheling	2.25 to 2.75
Rails for rolling	16.50 to 17.00
No. 1 locomotive tires	13.25 to 13.75
Short rails	17.25 to 17.75
Cast iron carwheels	12.50 to 13.00
No. 1 machinery cast	12.00 to 12.50
No. 1 railroad cast	12.00 to 12.50
Burnt cast	6.25 to 6.75
Stove plate	6.25 to 6.75
Agricul. malleable	10.75 to 11.25
Railroad malleable	13.25 to 13.75
Mixed hvy. cast	10.50 to 11.00

BIRMINGHAM

Per gross ton delivered to consumer:

Hvy. melting steel	$13.00
Scrap steel rails	$13.50 to 14.00
Short shov. turnings	7.50
Stove plate	9.50
Steel axles	18.50
Iron axles	18.50
No. 1 RR, wrought	10.00
Rails for rolling	16.00 to 16.50
No. 1 cast	15.00
Tramcar wheels	14.50 to 15.00

DETROIT

Dealers' buying prices per gross ton:

No. 1 hvy. mltng. industrial steel	$9.50 to $10.00
No. 2 hvy. mltng. steel	8.50 to 9.00
Borings and turnings	5.00 to 5.50
Long turnings	4.50 to 5.00
Short shov. turnings	5.25 to 5.75
No. 1 machinery cast	12.50 to 13.00
Automotive cast	13.00 to 13.50
Hvy. breakable cast	9.00 to 9.50
Stove plate	7.50 to 8.00
Hydraul. comp. sheets	11.00 to 11.50
New factory bushel	9.50 to 10.00
Sheet clippings	7.00 to 8.00
Flashings	9.50 to 10.00
Low phos. plate scrap	11.00 to 11.50

NEW YORK

Dealers' buying prices per gross ton on cars:

No. 1 hvy. mltng. steel	$11.00 to $11.50
No. 2 hvy. mltng. steel	8.50 to 9.00
Hvy. breakable cast	10.50 to 11.00
No. 1 machinery cast	11.50 to 12.00
No. 2 cast	9.50 to 10.00
Stove plate	9.50 to 10.00
Steel car axles	20.00 to 20.50
Shafting	15.50 to 16.00
No. 1 RR, wrought	11.00 to 11.50
No. 1 wrought long	9.50 to 10.00
Spec. iron & steel pipe	9.00 to 9.50
Rails for rolling	16.00 to 16.50
Clean steel turnings*	4.00 to 4.50
Cast borings*	3.50 to 4.00
No. 1 blast furnace	3.50 to 4.00
Cast borings (chem.)	9.50 to 10.00
Unprepared yard scrap	6.00 to 6.50
Light iron	3.00 to 3.50
Per gross ton, delivered local foundries:	
No. 1 machn. cast†	$13.50 to $14.00
No. 2 cast†	10.50 to 11.00

* $1.50 less for truck loads.
† Northern N. J. prices are $2 to $2.50 higher.

BOSTON

Dealers' buying prices per gross ton:

Breakable cast	$9.10
Machine shop turn.	2.38
Mixed bor. & turn.	2.00 to 2.25
Bun. skeleton long	7.65
Shafting	15.25 to 15.50
Cast bor. chemical	4.50 to 5.00
Per gross ton delivered consumers' yards:	
Textile cast	$13.00 to $14.00
No. 1 machine cast	13.00 to 14.00
Per gross ton delivered dealers' yards:	
No. 1 hvy. mltng. steel	$11.75 to $12.00
No. 2 steel	10.50 to 10.75

PACIFIC COAST

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel	$12.00 to $13.00
No. 2 hvy. mltng. steel	11.00 to 12.00

CANADA

Dealers' buying prices at their yards, per gross ton:

	Toronto	Montreal
No. 1 hvy. mltng. steel	$9.25	$8.75
No. 2 hvy. mltng. steel	8.00	7.50
Mixed dealers steel	6.75	6.25
Drop forge flashings	8.25	7.75
New loose clippings	4.25	3.75
Busheling	3.75	3.25
Scrap pipe	4.25	3.75
Steel turnings	4.25	3.75
Cast borings	3.75	3.25
Machinery cast	14.00	13.50
Dealers cast	12.00	11.50
Stove plate	10.00	9.50

EXPORT

Dealers' buying prices per gross ton:

New York, truck lots, delivered, barges

No. 1 hvy. mltng. steel	$12.00 to $12.50
No. 2 hvy. mltng. steel	10.50 to 11.00
No. 2 cast	10.50 to 11.00
Stove plate	9.50 to 10.00

Boston on cars at Army Base or Mystic Wharf

No. 1 hvy. mltng. steel	$13.75 to $14.00
No. 2 hvy. mltng. steel	12.75 to 13.00
Rails (scrap)	14.00 to 14.25

Philadelphia, delivered alongside boats, Port Richmond.

No. 1 hvy. mltng. steel	$15.00 to $15.25
No. 2 hvy. mltng. steel	13.50 to 13.75

PRICES ON FINISHED AND SEMI-FINISHED IRON AND STEEL

Steel prices on these pages are base prices only and f.o.b. mill unless otherwise indicated. On some products either quantity deductions or quantity extras apply. In many cases gage, width, cutting, physical, chemical extras, etc., apply to the base price. Actual realized prices to the mill, therefore, are affected by extras, deductions, and in most cases the amount of freight which must be absorbed in order to meet competition.

SEMI-FINISHED STEEL

Billets, Blooms and Slabs

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point (Rerolling only). Prices delivered Detroit are $2 higher. F.o.b. Duluth, billets only, $2 higher.

	Per Gross Ton
Rerolling	$34.00
Forging quality	40.00

Sheet Bars

Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point, Md.

	Per Gross Ton
Open hearth or bessemer	$34.00

Skelp

Pittsburgh, Chicago, Youngstown, Coatesville, Pa., Sparrows Point, Md.

	Per Lb.
Grooved, universal and sheared	1.90c.

Wire Rods
(No. 5 to 9/32 in.)

	Per Gross Ton
Pittsburgh, Chicago or Cleveland	$43.00
Worcester, Mass.	45.00
Birmingham	43.00
San Francisco	52.00

Rods over 9/32 in. or 47/64 in., inclusive, $5 a ton over base.

During the second quarter, non-integrated sheet makers were covered on sheet bars specifically for conversion into sheets and strip at a $4 a ton concession from the above base price. Other semi finished steel prices were not affected in this adjustment.

SOFT STEEL BARS

	Base per Lb.
Pittsburgh, Chicago, Gary, Cleveland, Buffalo and Birmingham	2.15c.
Detroit, delivered	2.25c.
Duluth	2.25c.
Philadelphia, delivered	2.47c.
New York	2.49c.
On cars dock Gulf ports	2.50c.
On cars dock Pacific ports	2.75c.

Due to elimination of quantity discount for third quarter business, large buyers are to pay $1 a ton more than previously. Most of these large consumers will have been covered at the old net price on orders taken previous to July 1 when the elimination of the quantity discount is slated to go into effect.

RAIL STEEL BARS

(For merchant trade)

Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham	2.00c.
On cars dock Tex. Gulf ports	2.45c.
On cars dock Pacific ports	2.70c.

BILLET STEEL REINFORCING BARS

(Straight lengths as quoted by distributers)

Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Cleveland, Youngstown or Sparrows Pt.	1.80c. to 2.05c.
Detroit, delivered	1.90c. to 2.15c.
On cars dock Tex. Gulf ports	2.15c. to 2.40c.
On cars dock Pacific ports	2.50c.

RAIL STEEL REINFORCING BARS

(Straight lengths as quoted by distributers)

Pittsburgh, Chicago, Gary, Buffalo, Cleveland, Youngstown or Birmingham	1.70c. to 1.90c.
Detroit, delivered	1.80c. to 2.00c.
On cars dock Tex. Gulf ports	2.05c. to 2.25c.
On cars dock Pacific ports	2.35c.

IRON BARS

Chicago and Terre Haute	2.15c.
Pittsburgh (refined)	3.60c.

COLD FINISHED BARS AND SHAFTING*

	Base per Lb.
Pittsburgh, Buffalo, Cleveland, Chicago and Gary	2.65c.
Detroit	2.70c.

* In quantities of 10,000 to 19,999 lb.

PLATES

	Base per Lb.
Pittsburgh, Chicago, Gary, Birmingham, Sparrows Point, Cleveland, Youngstown, Coatesville, Claymont, Del.	2.10c.*
Philadelphia, del'd	2.15c.
New York, del'd	2.19c. to 2.29c.
On cars dock Gulf ports	2.45c.
On cars dock Pacific ports	2.60c.
Wrought iron plates, P'tg.	3.80c.

* Subject to concessions, particularly in the East, of $2 a ton.

FLOOR PLATES

Pittsburgh or Chicago	3.35c.
New York, del'd	3.71c.
On cars dock Gulf ports	3.70c.
On cars dock Pacific ports	3.95c.

STRUCTURAL SHAPES

	Base per Lb.
Pittsburgh, Chicago, Gary, Buffalo, Bethlehem or Birmingham	2.10c.
Philadelphia, del'd	2.215c.
New York, del'd	2.27c.
On cars dock Gulf ports	2.45c.
On cars dock Pacific ports	2.70c.

STEEL SHEET PILING

	Base per Lb.
Pittsburgh, Chicago or Buffalo	2.40c.
On cars dock Gulf ports	2.85c.
On cars dock Pacific ports	2.90c.

RAILS AND TRACK SUPPLIES

F.o.b. Mill

Standard rails, heavier than 60 lb., per gross ton	$40.00
Angle bars, per 100 lb.	2.70

F.o.b. Basing Points

Light rails (from billets) per gross ton	$40.00
Light rails (from rail steel) per gross ton	39.00

	Base per Lb.
Cut spikes	3.00c.
Screw spikes	4.55c.
Tie plates, steel	2.15c.
Tie plates, Pacific Coast ports	2.25c.
Track bolts, to steam railroads	4.15c.
Track bolts to jobbers, all sizes (per 100 counts)	65-5

Basing points on light rails are Pittsburgh, Chicago and Birmingham; on spikes and tie plates, Pittsburgh, Chicago, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minnequa, Colo., Birmingham and Pacific Coast ports; on tie plates alone, Steelton, Pa., Buffalo; on spikes alone, Youngstown, Lebanon, Pa., Richmond, Va.

SHEETS

Hot Rolled

	Base per Lb.
Pittsburgh, Gary, Birmingham, Buffalo, Sparrows Point, Cleveland, Youngstown, Middletown or Chicago	2.00c.
Detroit, delivered	2.10c.
Philadelphia, delivered	2.17c.
Granite City	2.10c.
On cars dock Pacific ports	2.50c.
Wrought iron, Pittsburgh	4.10c.

Cold Rolled*

Pittsburgh, Gary, Buffalo, Youngstown, Cleveland, Middletown or Chicago	3.05c.
Detroit, delivered	3.15c.
Granite City	3.15c.
Philadelphia, delivered	3.37c.
On cars dock Pacific ports	3.65c.

* Mill run sheets are 10c. per 100 lb. less than base; and primes only, 25c. above base.

From May 10 up to and including May 15, reductions from the base price of hot and cold rolled sheets running from $4 to $8 a ton were prevalent. Concessions withdrawn, on May 15.

Subsequent to May 15, many orders originally placed at $4 to $6 below the base price were adjusted to the full $8 concession.

Galvanized Sheets, 24 Gage

Pittsburgh, Chicago, Gary Sparrows Point, Buffalo, Middletown, Youngstown or Birmingham	3.50c.
Philadelphia, delv'd	3.67c.
Granite City	3.60c.
On cars dock Pacific ports	4.00c.
Wrought iron Pittsburgh	6.10c.

Electrical Sheets
(*F.o.b. Pittsburgh*)

	Base per Lb.
Field grade	3.20c.
Armature	3.55c.
Electrical	4.05c.
Motor	4.95c.
Dynamo	5.65c.
Transformer 72	6.15c.
Transformer 65	7.15c.
Transformer 58	7.65c.
Transformer 52	8.45c.

Silicon Strip in coils—Sheet price plus silicon sheet extra width extra plus 25c per 100 lb. for coils. Pacific ports add 70c. a 100 lb.

Long Ternes

No. 24 unassorted 8-lb. coating f.o.b. Pittsburgh or Gary	3.80c.
F.o.b. cars dock Pacific ports	4.50c.

Vitreous Enameling Stock, 20 Gage*

Pittsburgh, Chicago, Gary, Youngstown, Middletown or Cleveland	3.35c.
Detroit, delv'd	3.45c.
Granite City	3.45c.
On cars dock Pacific ports	3.95c.

TIN MILL PRODUCTS

***Tin Plate**

	Per Base Box
Standard cokes, Pittsburgh, Chicago and Gary	$5.00
Standard cokes, Granite City	5.10

* Prices effective Nov. 10 on shipments through first quarter of 1939.

Special Coated Manufacturing Ternes

	Per Base Box
Granite City	$4.40
Pittsburgh or Gary	4.30

Roofing Terne Plate
(*F.o.b. Pittsburgh*)

(Per Package, 112 sheets, 20 x 28 in.)	
8-lb. coating I.C.	$12.00
15-lb. coating I.C.	14.00
20-lb. coating I.C.	15.00
25-lb. coating I.C.	16.00
30-lb. coating I.C.	17.25
40-lb. coating I.C.	19.50

Black Plate, 29 gage and lighter

Pittsburgh, Chicago and Gary	3.05c.
Granite City	3.15c.
On cars dock Pacific ports, boxed	4.00c.

HOT ROLLED STRIP

(*Widths up to 12 in.*)

	Base per Lb.
Pittsburgh, Chicago, Gary, Cleveland, Middletown, Youngstown or Birmingham	2.00c.
Detroit, delivered	2.10c.

Cooperage Stock

Pittsburgh & Chicago	2.10c.

From May 10 up to and including May 15, reductins in the base price of hot rolled strip running from $4 to $8 a ton were prevalent. Concessions withdrawn on May 15.

Subsequent to May 15, many orders originally placed at $4 to $6 below the base price were adjusted to the full $8 concession.

COLD ROLLED STRIP*

	Base per Lb.
Pittsburgh, Youngstown or Cleveland	2.80c.
Chicago	2.90c.
Detroit, delivered	2.90c.
Worcester	3.00c.

* Carbon 0.25 and less.

Commodity Cold Rolled Strip

Pittsburgh, Youngstown, or Cleveland	2.95c.
Detroit, delivered	3.05c.
Worcester	3.35c.

From May 10 up to and including May 15, reductions from the base price of cold rolled strip amounting to $4 a ton were prevalent. Concessions withdrawn on May 15.

COLD ROLLED SPRING STEEL

	Pittsburgh and Cleveland	Worcester
Carbon 0.26-0.50%	2.80c.	3.00c.
Carbon 0.51-0.75	4.30c.	4.50c.
Carbon 0.76-1.00	6.15c.	6.35c.
Carbon 1.01-1.25	8.35c.	8.55c.

WIRE PRODUCTS

(Carload lots, f.o.b. Pittsburgh, Chicago, Cleveland and Birmingham)

To Manufacturing Trade

	Per Lb.
Bright wire	2.60c.
Galvanized wire, base	2.65c.*
Spring wire	3.20c.

* On galvanizing wire to manufacturing trade, size and galvanizing extras are charged, the price Nos. 6 to 9 gage, inclusive, thus being 3.15c.

To the Trade

	Base per Keg
Standard wire nails	$2.45
Coated nails	2.45
Cut nails, carloads	3.60
Base per 100 Lb.	
Annealed fence wire	$2.95
Galvanized fence wire	3.35
Polished staples	3.15
Galvanized staples	3.40
Twisted barbless wire	3.30
Woven wire fence, base column.	67
Single loop bale ties, base col...	56
Stand. 2 pt., 12.5 gage barbed cattle wire, per 80 rod spool...	$2.62
Stand. 2 pt., 12.5 gage barbed hog wire, per 80 rod spool....	$2.80

Note: Birmingham base same on above items, except spring wire.

Add $4 a ton for Mobile, Ala.; $5 for New Orleans; $6 for Lake Charles to above bases, except on galvanized and annealed merchant fence wire, which are $1 a ton additional in each case.

STEEL AND WROUGHT IRON PIPE AND TUBING

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

F.o.b. Pittsburgh only on wrought iron pipe.

Butt Weld

Steel		*Wrought Iron*		
In.	Black	Galv.	In.	Black	Galv.
⅛	56	36	¼ & ⅜	..+9	+30
¼ to ⅜	.59	43½	½	24	6½
½	....63½	54	¾	30	13
¾	....66½	58	1 & 1¼	.34	19
1 to 3	..68½	60½	1½	38	21½
			2	....37½	21

Lap Weld

2	61	52½	2	....30½	15
2½ & 3	..64	55½	2½ to 3½	31½	17½
3½ to 6	.66	57½	4	....33½	21
7 & 8	.65	55½	4½ to 8	.32½	20
9 & 10	.64½	55	9 to 12	..28½	15
11 & 12	.63½	54			

Butt weld, extra strong, plain ends

⅛	....54½	41½	¼ & ⅜	.+10	+43
½ to ⅜	.56½	45½	½	25	9
½	....61½	37½	¾	31	15
¾	....65½	57½	1 to 2	...38	22½
1 to 3	...67	60			

Lap weld, extra strong, plain ends

2	59	51½	2	....33½	18½
2½ & 3	..63	55½	2½ to 4	.39½	25½
3½ to 6	.66½	59	4½ to 6	.37½	24
7 & 8	.65½	56	7 & 8	..38½	24½
9 & 10	.64½	55	9 to 12	..32	20½
11 & 12	.63½	54			

On butt weld and lap weld steel pipe jobbers are granted a discount of 5%. On less-than-carload shipments prices are determined by adding 25 and 30% and the carload freight rate to the base card.

F.o.b. Gary prices are two points lower discount or $4 a ton higher than Pittsburgh or Lorain on lap weld and one point lower discount, or $2 a ton higher, on all butt weld 8 in. and smaller.

Boiler Tubes

Seamless Steel and Lap Weld Commercial Boiler Tubes and Locomotive Tubes. Minimum Wall.

(Net base prices per 100 ft. f.o.b. Pittsburgh in carload lots)

	Seamless Cold Drawn	Seamless Hot Rolled	Lap Weld Hot Rolled
1 in. o.d....13 B.W.G.	$ 9.01	$ 7.82	....
1¼ in. o.d...13 B.W.G.	10.67	9.26	....
1½ in. o.d...13 B.W.G.	11.70	10.23	$9.72
1¾ in. o.d...13 B.W.G.	13.42	11.64	11.06
2 in. o.d....13 B.W.G.	15.03	13.04	12.38
2¼ in. o.d...13 B.W.G.	16.76	14.54	13.79
2¼ in. o.d...12 B.W.G.	18.45	16.01	15.16
2½ in. o.d...12 B.W.G.	20.21	17.54	16.58
2¾ in. o.d...12 B.W.G.	21.42	18.59	17.54
3 in. o.d....12 B.W.G.	22.48	19.50	18.35
3½ in. o.d...11 B.W.G.	28.37	24.62	23.15
4 in. o.d....10 B.W.G.	35.20	30.54	28.66
4½ in. o.d...10 B.W.G.	43.04	37.35	35.22
5 in. o.d.... 9 B.W.G.	54.01	46.87	44.25
6 in. o.d.... 7 B.W.G.	82.93	71.96	68.14

Extras for less carload quantities:

40,000 lb. or ft. over	Base
30,000 lb. or ft. to 39,999 lb. or ft.	5%
20,000 lb. or ft. to 29,999 lb. or ft.	10%
10,000 lb. or ft. to 19,999 lb. or ft.	20%
5,000 lb. or ft. to 9,999 lb. or ft.	30%
2,000 lb. or ft. to 4,999 lb. or ft.	45%
Under 2,000 lb. or ft.	65%

CAST IRON WATER PIPE

	Per Net Ton
*6-in. and larger, del'd Chicago.	$51.00
6-in. and larger, del'd New York	49.00
*6-in. and larger, Birmingham.	43.00
6-in. and larger, f.o.b. dock, San Francisco or Los Angeles....	52.00
F.o.b. dock, Seattle	52.00
4-in. f.o.b. dock, San Francisco or Los Angeles	55.00
F.o.b. dock, Seattle	52.00

Class "A" and gas pipe, $3 extra 4-in. pipe is $3 a ton above 6-in.

Prices for lots of less than 200 tons. For 200 tons and over, 6-in. and larger is $42, Birmingham, and $50 delivered Chicago and 4-in. pipe, $45, Birmingham, and $54 delivered Chicago.

BOLTS, NUTS, RIVETS, SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland Birmingham or Chicago)

	Per Cent Off List
Machine and carriage bolts:	
½ in. & 6 in. and smaller....	68½
Larger and longer up to 1 in..	66
1⅛ in. and larger	64
Lag bolts	66
Plow bolts, Nos. 1, 2, 3 and 7	68½
Hot pressed nuts, and c.p.c. and t-nuts, square or hex. blank or tapped:	
½ in. and smaller	67
9/16 in. to 1 in. inclusive.....	64
1⅛ in. and larger	62

On the above items with the exception of plow bolts, there is an additional allowance of 10 per cent for full container quantities.

On all of the above items, there is an additional 5 per cent allowance for carload shipments.

	U.S.S.	S.A.E.
Semi-fin. hexagon nuts		
½ in. and smaller	67	70
9/16 to 1 in.	64	65
1⅛ in. and larger.....	62	62

In full container lots, 10 per cent additional discount.

Stove bolts in packages, nuts attached 72½

Stove bolts in packages, with nuts separate .....72½ and 12½

Stove bolts in bulk 84

On stove bolts freight is allowed to destination on 200 lb. and over.

Large Rivets

(½ in. and larger)

Base Per 100 Lb.

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham $3.40

Small Rivets

(7/16 in. and smaller)

Per Cent Off List

F.o.b. Pittsburgh, Cleveland Chicago, Birmingham ....65 and 10

Cap and Set Screws

(Freight allowed to destination)

Per Cent Off List

Milled hexagon head, cap screws, 1 in. dia. and smaller.....50 and	10
Milled headless set screws, cut thread ¾ in. and smaller	70
Upset hex. head cap screws U.S.S. or S.A.E. thread 1 in. and smaller	67½
Upset set screws, cup and oval points	75
Milled studs	60

Alloy and Stainless Steel

Alloy Steel Blooms, Billets and Slabs

F.o.b. Pittsburgh, Chicago, Canton, Massillon, Buffalo, Bethlehem. Base price, $56.00 a gross ton.

Alloy Steel Bars

F.o.b. Pittsburgh, Chicago, Buffalo, Bethlehem, Massillon or Canton.

Open-hearth grade, base .....2.70c.

Delivered, Detroit .....2.80c.

S.A.E. Series Numbers	Alloy Differential per 100 Lb.
2100 (1½% Nickel)	$0.75
2300 (3½% Nickel)	1.55
2500 (5% Nickel)	2.25
3100 Nickel-chromium	0.70
3200 Nickel-chromium	1.35
3300 Nickel-chromium	3.80
3400 Nickel-chromium	3.20
4100 Chromium-molybdenum (0.15 to 0.25 Molybdenum)	0.55
4100 Chromium-molybdenum (0.25 to 0.40 Molybdenum)	0.75
4600 Nickel - molybdenum (0.20 to 0.30 Mo. 1.50 to 2.00 Ni.)	1.10
5100 Chrome steel (0.60-0.90 Cr.)	0.35
5100 Chrome steel (0.80-1.10 Cr.)	0.45
5100 Chromium spring steel.....	0.15
6100 Chromium-vanadium bar..	1.20
6100 Chromium-vanadium spring steel	0.35
Chromium-nickel vanadium	1.50
Carbon-vanadium	0.85

These prices are for hot-rolled steel bars. The differential for most grades in electric furnace steel is 50c. higher. Slabs with a section area of 16 in. and 2½ in. thick or over take the billet base.

Alloy Cold-Finished Bars

F.o.b. Pittsburgh, Chicago, Gary, Cleveland or Buffalo, 3.35c. base per lb. Delivered Detroit, 3.45c., carlots.

CORROSION & HEAT RESISTANT ALLOYS

(Base prices, cents per lb., f.o.b. Pittsburgh)

Chrome-Nickel

	No. 304	No. 302
Forging billets	21.25c.	20.40c.
Bars	25c.	24c.
Plates	29c.	27c.
Structural shapes..	25c.	24c.
Sheets	36c.	34c.
Hot-rolled strip ...	23.50c.	21.50c.
Cold-rolled strip ...	30c.	28c.
Drawn wire	25c.	24c.

Straight Chrome

	No. 410	No. 430	No. 442	No. 446
Bars .	18.50c.	19c.	22.50c.	27.50c.
Plates	21.50c.	22c.	25.50c.	30.50c.
Sheets	26.50c.	29c.	32.50c.	36.50c.
Hot Strip	17c.	17.50c.	24c.	35c.
Cold stp.	22c.	22.50c.	32c.	52c.

TOOL STEEL

High speed	67c.
High-carbon-chrome	43c.
Oil-hardening	24c.
Special	22c.
Extra	18c.
Regular	14c.

Prices for warehouse distribution to all points on or East of Mississippi River are 2c. a lb higher. West of Mississippi quotations are 3c a lb. higher.

British and Continental

BRITISH

Per Gross Ton
f.o.b. United Kingdom Ports

Ferromanganese, export	Nominal
Tin plate, per base box	20s. 3d. to 21s. 6d.
Steel bars, open hearth	£10 8s.
Beams, open-hearth	£10
Channels, open hearth	£10 5s.
Angles, open-hearth	£10
Black sheets, No. 24 gage.	£13
Galvanized sheets, No. 24 gage	£15 15s

CONTINENTAL

Per Gross Ton, Gold £.
f.o.b. Continental Ports

Billets, Thomas	Nominal
Wire rods, No. 5 B.W.G.	£5 10s.
Steel bars, merchant	£5 5s.
Sheet Bars	Nominal
Plate ¼ in. and up	£5 7s.
Plate 3/16 in. and 5 mm.	£5 13s.
Sheets ⅛ in.	£5 9s. 6d
Beams, Thomas	£4 18s.
Angles (Basic)	£4 18s.
Hoops and strip, base	£5 12s.

RAW MATERIALS PRICES

PIG IRON

No. 2 Foundry

F.o.b. Everett, Mass.	$22.00
F.o.b. Bethlehem, Birdsboro and Swedeland, Pa., and Sparrows Point, Md.	22.00
Delivered Brooklyn	24.50
Delivered Newark or Jersey City	23.53
Delivered Philadelphia	22.84
F.o.b. Neville Island, Erie, Pa., Toledo, Chicago, Granite City, Cleveland and Youngstown	21.00
F.o.b. Buffalo	21.00
F.o.b. Detroit	21.00
Southern, delivered Cincinnati	21.06
Northern, delivered, Cincinnati	21.44
F.o.b. Duluth	21.50
F.o.b. Provo, Utah	19.00
Delivered, San Francisco, Los Angeles or Seattle	24.50
F.o.b. Birmingham*	17.38

* Delivered prices on southern iron for shipment to northern points are 38c. a ton below delivered prices from nearest northern basing point on iron with phosphorus content of 0.70 per cent and over.

Malleable

Base prices on malleable iron are 50c. a ton above No. 2 foundry quotations at Everett, Eastern Pennsylvania furnaces, Erie and Buffalo. Elsewhere they are the same, except at Birmingham and Provo, which are not malleable iron basing points.

Basic

F.o.b. Everett, Mass.	$21.50
F.o.b. Bethlehem, Birdsboro, Swedeland and Steelton, Pa., and Sparrows Point, Md.	21.50
F.o.b. Buffalo	20.00
F.o.b. Neville Island, Erie, Pa., Toledo, Chicago, Granite City, Cleveland and Youngstown	20.50
Delivered Philadelphia	22.34
Delivered Canton, Ohio	21.89
Delivered Mansfield, Ohio	22.44
F.o.b. Birmingham	16.00

Bessemer

F.o.b. Buffalo	$22.00
F.o.b. Everett, Mass.	23.00
F.o.b. Bethlehem, Birdsboro and Swedeland, Pa.	23.00
Delivered Newark or Jersey City	24.53
Erie, Pa., and Duluth	22.00
F.o.b. Neville Island, Toledo, Chicago and Youngstown	21.50
F.o.b. Birmingham	22.00
Delivered Cincinnati	22.11
Delivered Canton, Ohio	22.89
Delivered Mansfield, Ohio	23.44

Low Phosphorus

Basing points: Birdsboro, Pa., Steelton, Pa., and Standish, N. Y.	26.50

Gray Forge

Valley or Pittsburgh furnace	$20.50

Charcoal

Lake Superior furnace	$25.00
Delivered Chicago	28.34

Canadian Pig Iron

Per Gross Ton

Montreal	
Foundry iron	$24.50 base
Malleable	25.00 base
Basic	24.50 base

Toronto	
Foundry iron	$22.50 base
Malleable	23.00 base
Basic	22.50 base

On all grades 2.25 per cent silicon and under is base. For each 25 points of silicon over 2.25 per cent an extra of 25c. is charged.

FERROALLOYS

Ferromanganese

F.o.b. New York, Philadelphia, Baltimore, Mobile or New Orleans.

Per Gross Ton

Domestic, 80% (carload)	$80.00

Spiegeleisen

Per Gross Ton Furnace

Domestic, 19 to 21%	$28.00
Domestic, 26 to 28%	33.00

Electric Ferrosilicon

Per Gross Ton Delivered; Lump Size

50% (carload lots, bulk)	$69.50*
50% (ton lots in 50 gal. bbl.)	80.50*
75% (carload lots, bulk)	126.00*
75% (ton lots in 50 gal. bbl.)	139.00*

Bessemer Ferrosilicon

F.o.b. Furnace, Jackson, Ohio

Per Gross Ton

10.00 to 10.50%	$30.50

For each additional 0.50% silicon up to 12%, 50c. per ton is added. Above 12% add 75c. per ton.

For each unit of maganese over 2%, $1 per ton additional. Phosphorus 0.75% or over, $1 per ton additional.

Base prices at Buffalo are $1.25 a ton higher than at Jackson.

Silvery Iron

Per Gross Ton

F.o.b. Jackson, Ohio, 5.00 to 5.50%	$24.50

For each additional 0.5% silicon up to 12%, 50c. a ton is added. Above 12% add 75c. a ton.

The lower all-rail delivered price from Jackson or Buffalo is quoted with freight allowed. Base prices at Buffalo are $1.25 a ton higher than at Jackson.

Manganese, each unit over 2%, $1 a ton additional. Phosphorus 0.75% or over, $1 a ton additional.

Ferrochrome

Per Lb. Contained Cr., Delivered Carlots, Lump Size, on Contract

4 to 6% carbon	10.50c.*
2% carbon	16.50c.*
1% carbon	17.50c.*
0.10% carbon	19.50c.*
0.06% carbon	20.00c.*

Silico-Manganese

Per Gross Ton, Delivered, Lump Size, Bulk, on Contract

3% carbon	$83.00
2.50% carbon	88.00
2% carbon	93.00
1% carbon	103.00

Other Ferroalloys

Ferrotungsten, per lb. contained W del., carloads	$1.75
Ferrotungsten, 100 lbs. and less	2.00
Ferrovanadium, contract, per lb. contained V., delivered	$2.70 to $2.90†
Ferrocolumbium, per lb. contained columbium, f.o.b. Niagara Falls, N. Y., tons lots	$2.25†
Ferrocarbontitanium, 15 to 18% Ti, 7 to 8% C, f.o.b. furnace carload and contract per net ton	$142.50
Ferrocarbontitanium, 17 to 20% Ti, 3 to 5% C, f.o.b. furnace, carload and contract, per net ton	$157.50
Ferrophosphorus, electric, or blast furnace material, in carloads, f.o.b. Anniston, Ala., for 18%, with $3 unitage, freight equalized with Rockdale, Tenn., per gross ton	$58.50
Ferrophosphorus, electrolytic, 23-26% in car lots, f.o.b Monsanto (Siglo), Tenn., 24%, per gross ton, $3 unitage, freight equalized with Nashville	$75.00
Ferromolybdenum, per lb. Mo. f.o.b. furnace	95c.
Calcium molybdate, per lb. Mo. f.o.b. furnace	80c
Molybdenum oxide briquettes 48-52% Mo; per lb. contained Mo, f.o.b. Langeloth, Pa.	80c.

* Spot prices are $5 per ton higher.
† Spot prices are 10c. per lb. of contained element higher.

ORES

Lake Superior Ores

Delivered Lower Lake Ports

Per Gross Ton

Old range, Bessemer, 51.50%...	$5.25
Old range, non-Bessemer, 51.50%	5.10
Messabi, Bessemer, 51.50%...	5.10
Messabi, non-Bessemer, 51.50%..	4.95
High phosphorus, 51.50%...	4.85

Foreign Ore

C.i.f. Philadelphia or Baltimore

Per Unit

Iron, low phos., copper free, 55 to 58% dry, Algeria	12c
Iron, low phos., Swedish, average, 68½% iron	12c
Iron, basic or foundry, Swedish, aver. 65% iron	11c
Iron, basic or foundry, Russian, aver. 65% iron	Nominal
Man., Caucasian, washed 52%	29c
Man., African, Indian, 44-48%	25c
Man., African, Indian, 49-51%	28c
Man., Brazilian, 46 to 48%	27c

Per Short Ton Unit

Tungsten, Chinese, Wolframite, duty paid, delivered	$18.50
Tungsten, domestic, scheelite delivered	$15.00 to $17.00
Chrome or (lump) c.i.f. Atlantic Seaboard, per gross ton: South African (low grade)	$15.00
Rhodesian, 45%	19.00
Rhodesian, 48%	22.00
Turkish, 48-49%	22.50
Turkish, 45-56%	19.50
Turkish, 40-44%	17.00
Chrome concentrates (Turkish) c.i.f Atlantic Seaboard, per gross ton: 50%	$24.00
48-49%	23.50

FLUORSPAR

Per Net Ton

Domestic washed gravel, 85-5, f.o.b. Kentucky and Illinois mines, all rail	$18.00
Domestic, f.o.b. Ohio River landing barges	19.00
No. 2 lump, 85-5, f.o.b. Kentucky and Ill. mines	19.00
Foreign, 85% calcium, fluoride, not over 5% silicon, c.i.f. Atlantic ports, duty paid	21.50
Domestic No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silicon, f.o.b. Illinois and Kentucky mines	31.50

FUEL OIL

Per Gal

No. 2, f.o.b. Bayonne	3.875c.
No. 6, f.o.b. Bayonne	2.50c.
No. 5 Bur. Stds., del'd Chicago	3.25c
No. 6 Bur. Stds., del'd Chicago	2.75c
No. 3 distillate, del'd Cleve'd.	5.50c.
No. 4 industrial, del'd Cleve'd.	5.25c.
No. 5 industrial, del'd Cleve'd.	3.00c.
No. 6 industrial, del'd Cleve'd.	2.75c

COKE

Per Net Ton

Furnace, f.o.b. Connellsville, Prompt	$3.75
Furnace, f.o.b. Connellsville, Prompt	$4.75 to 5.50
Foundry, by - product, Chicago ovens	10.25
Foundry, by - product, del'd New England	12.50
Foundry, by - product, del'd Newark or Jersey City	10.88 to 11.40
Foundry, by - product, Philadelphia	10.95
Foundry, by - product, delivered Cleveland	10.30
Foundry, by - product, delivered Cincinnati	9.75
Foundry, Birmingham	7.50
Foundry, by - product, del'd St. Louis industrial district	10.75 to 11.00
Foundry, from Birmingham, f.o.b. cars dock Pacific ports	14.75

IRON AND STEEL WAREHOUSE PRICES

PITTSBURGH*

	Base per Lb.
Plates	3.40c.
Shapes	3.40c.
Soft steel bars and small shapes	3.35c.
Reinforcing steel bars	2.70c.
Cold finished bars and screw stock	3.65c.
Hot rolled strip	3.60c.
Hot rolled sheets	3.35c.
Galv sheets (24 ga.) 500 lb. to 1499 lb.	4.50c.
Wire, black, soft annealed	3.15c.
Wire, galv., soft	3.55c.
Track spikes (1 to 24 kegs)	3.60c.
Wire nails (in 100-lb kegs)	2.65c.

On plates, structurals, bars, strip and hot rolled sheets, base applied to orders of 400 to 1999 lb.
On reinforcing bars base applies to orders of less than one ton and includes switching and cartin: charge
All above prices for delivery within the Pittsburgh switching district.

NEW YORK

	Base per Lb.
Plates, ¼ in. and heavier	3.76c.
Structural shapes	3.75c.
Soft steel bars, round	3.84c.
Iron bars, Swed. charcoal	7.50 to 8.25c.
Cold-fin. shafting and screw stock:	
Rounds, squares, hexagons	4.09c.
Flats up to 12 in. wide	4.09c.
Cold-rolled strip, soft and quarter hard	3.51c.
Hot-rolled strip, soft O.H.	3.96c.
*Hot-rolled sheets (8-30 ga.)	3.40c.
Galv. sheets (24 ga.)	4.50c.
Long ternes (24 ga.)	5.50c.
Cold-rolled sheets (20 ga.)	
Standard quality	4.60c.
Deep drawing	4.85c.
Stretcher leveled	5.10c.
SAE, 2300, hot-rolled	7.35c.
SAE, 3100, hot-rolled	5.90c.
SAE, 6100, hot-rolled annealed.	8.75c.
SAE, 2300, cold-rolled	8.59c.
SAE, 3100, cold-rolled, annealed	8.19c.
Floor plate, ⅛ in. and heavier	5.56c.
Standard tool steel	12.50c.
Wire, black, annealed (No. 9).	4.35c.
Wire, galv. (No. 9)	4.70c.
Open-hearth spring steel	4.75c. to 10.25c.
Common wire nails, per keg in 25 keg lots	$2.90

*For lots less than 2000 lb.

CHICAGO

	Base per Lb.
Plates and structural shapes	3.55c.
Soft steel bars, rounds and angles	3.50c.
Soft steel squares, hexagons, channels and Tees	3.65c.
Hot rolled strip	3.60c.
Floor plates	5.15c.
Hot rolled sheets	3.35c.
Galvanized sheets	4.25c.
Cold rolled sheets	4.30c.
Cold finished carbon bars	3.75c.

Above prices are subject to deductions and extras for quantity and are f.o.b. consumer's plant within Chicago free delivery zone.

CLEVELAND

	Base per Lb.
Plates	3.40c.
Structural shapes	3.58c.
Soft steel bars	3.25c.
Reinfor. bars (under 2000 lb.)†	2.55c.
Cold-fin. bars (1000 lb., over.)	3.75c.
Hot-rolled strip	3.50c.
Cold rolled sheets	4.55c.
Cold-finished strip	3.20c.
Galvanized sheets (No. 24)	4.62c.
Hot-rolled sheets	3.35c.
Floor plates, 3/16 in. and heavier	5.18c.
*Black ann'l'd wire, per 100 lb.	$3.10
*No. 9 galv. wire, per 100 lb.	3.50
*Cum. wire nails, base per keg	2.60
Hot rolled alloy steel (3100)	5.85c.
Cold rolled alloy steel (3115).	6.75c.

* For 5000 lb. or less.
† 500 lb. base quantity.
Prices shown on hot rolled bars, strip, sheets, shape sand plates are for 400 to 1999 lb. Alloy steel, 1000 lb. and over; galvanized sheets, 150 to 1499 lb.; cold rolled sheets, 399 lb. and under.

ST. LOUIS

	Base per Lb.
Plates and structural shapes	3.47c.
Bars, soft steel (rounds and flats)	3.62c.
Bars, soft steel (squares, hexagons, ovals, half ovals and half rounds)	3.77c.
Cold fin. rounds, shafting, screw stock	4.02c.
Galv. sheets (24 ga.)	4.53c.
Hot rolled sheets	3.38c.
Galv. corrugated sheets, 24 ga. and heavier*	4.58c.
Structural rivets	5.02c.

* No. 26 and lighter take special prices.

BOSTON

	Base per Lb.
Structural shapes, 3 in. and larger	3.85c.
Plates, ¼ in. and heavier	3.85c.
Bars	3.88c.
Heavy hot rolled sheets	3.71c.
Hot rolled sheets	4.21c.
Hot rolled annealed sheets	4.61c.
Galvanized sheets	4.61c.
Cold rolled sheets	4.71c.

The following quantity differentials apply: Less than 100 lb., plus $1.50 per 100 lb.; 100 to 399 lb. plus 50c.; 400 to 1999 lb. base; 2000 to 9999 lb. minus 20c.; 10,000 to 39,999 lb. minus 30c.; 40,000 lb. and over minus 40c.

BUFFALO

	Base per Lb.
Plates	3.62c.
Floor plates	5.25c.
Struc. shapes	3.40c.
Soft steel bars	3.35c.
Reinforcing bars (20,000 lb. or more)	2.05c
Cold-fin. flats, squares, rounds, and hex.	3.65c.
Hot-rolled sheets, 3/16 x 14 in. to 48 in. wide incl. also sizes No. 8 to 30 ga.	3.35c.
Galv. sheets (24 ga.)	4.50c.
Band and hoops	3.82c.

NEW ORLEANS

	Base per Lb.
Mild steel bars	4.20c.
Reinforcing bars	3.24c.
Structural shapes	4.10c.
Plates	4.10c.
Hot-rolled sheets, No. 10	4.35c.
Steel bands	4.75c.
Cold-finished steel bars	5.10c.
Structural rivets	4.35c.
Boiler rivets	4.85c.
Common wire nails, base per keg	3.55
Bolts and nuts, per cent off list	60

REFRACTORIES PRICES

Fire Clay Brick

	Per 1000 f.o.b. Works
Super-duty brick, at St. Louis	$60.80
First quality Pennsylvania, Maryland, Kentucky, Missouri and Illinois	47.50
First quality, New Jersey	52.50
Second quality, Pennsylvania, Maryland, Kentucky, Missouri and Illinois	42.75
Second quality, New Jersey	49.00
No. 1, Ohio	39.90
Ground fire clay, per ton	7.10

Silica Brick

	Per 1000 f.o.b. Works
Pennsylvania	$47.50
Chicago District	55.10
Birmingham	47.50
Silica cement per net ton (Eastern)	8.55

Chrome Brick

	Net per Ton
Standard f.o.b. Baltimore, Plymouth Meeting and Chester	$47.00
Chemically bonded f.o.b. Baltimore, Plymouth Meeting and Chester, Pa.	47.00

Magnesite Brick

	Net per Ton
Standard f.o.b. Baltimore and Chester	$67.00
Chemically bonded, f.o.b. Baltimore	57.00

Grain Magnesite

	Net per Ton
Imported, f.o.b. Baltimore and Chester, Pa. (in sacks)	$45.00
Domestic, f.o.b. Baltimore and Chester in sacks	40.00
Domestic, f.o.b. Chewelah, Wash. (in bulk)	22.00

PHILADELPHIA

	Base per Lb.
*Plates, ¼-in. and heavier	3.40c.
*Structural shapes	3.40c.
*Soft steel bars, small shapes, iron bars (except bands)	3.60c.
‡Reinforc. steel bars, square and deformed	2.61c
Cold-finished steel bars	4.11c.
*Steel hoops	4.10c
*Steel bands, No. 12 and 3/16 in. incl.	3.60c
*Spring steel	4.75c.
†Hot-rolled anneal. sheets	3.40c
†Galvanized sheets (No. 24)	4.43c.
*Diam. pat. floor plates, ¼ in.	5.00c

These prices are for delivery in Philadelphia trucking area.
*For quantities between 400 and 1999 lb.
†For 10 bundles or over.
‡For one to five tons.

BIRMINGHAM

	Base per Lb
Bars and bar shapes	3.50c
Structural shapes and plates	3.55c.
Hot rolled sheets No. 10 ga.	3.35c.
Galvanized sheets No. 24 ga. or more	4.75c
Strip	3.60c.
Reinforcing bars	3.50c
Floor plates	5.88
Cold finished bars	4.43
Machine and carriage bolts	50 & 10 off list
Rivets (structural)	$4.60 base

On plates, shapes, bars, hot-rolled strip heavy hot-rolled sheets, the base applies on 400 to 1999 lb. All prices are f.o.b. consumer's plant.

PACIFIC COAST

	Base per Lb		
	San Francisco	Los Angeles	Seattle
Plates, tanks and U. M.	3.45c.	4.00c.	3.40c.
Shapes, standard	3.45c.	3.90c.	3.55c.
Soft steel bars	3.50c.	4.00c.	3.65c.
Reinforcing bars, f.o.b. cars dock Pacific ports	2.275c.	open.	2.975c
Hot-rolled sheets (No. 10)	3.45c.	4.05c.	3.80c.
Galv. sheets (No. 24 and lighter)	5.15c.	4.75c.	4.75c
Galv. sheets (No. 22 and heavier)	5.40c.	4.75c.	4.75c
Cold-finished steel Rounds	6.55c.	6.60c.	7.10c
Squares and hexagons	7.80c.	7.85c.	7.10c
Flats	8.30c.	8.35c.	8.10c
Common wire nails—base per keg less carload	$3.00	$2.85	$3.00

All items subject to differentials for quantity.

ST. PAUL

	Base per Lb
Mild steel bars, rounds	4.10c
Structural shapes	4.00c.
Plates	4.00c.
Cold-finished bars	4.83c.
Hot-rolled annealed sheets, No. 24	4.75c
Galvanized sheets, No. 24	5.00c

On mild steel bars, shapes and plates the base applies on 400 to 14,999 lb. On hot-rolled sheets, galvanized sheets and cold-rolled sheets base applies on 15,000 lb. and over. Base on cold-finished bars is 1000 lb and over of a size.

DETROIT

	Base per Lb.
Soft steel bars	3.33c.
Structural shapes	3.65c.
Plates	3.60c.
Floor plates	5.27c.
Hot-rolled sheets, 8 to 30 gages above 12 in. and 3/16 in., 24 in. to 48 in. wide	3.43c.
Cold-rolled sheets	4.50c.
*Galvanized sheets	4.59c.
Hot-rolled strip, under No. 12	3.68c.
Hot-rolled strip, No. 12 and over	3.43c.
Cold-finished bars	3.50c.
Cold-rolled strip	3.55c
Hot-rolled alloy steel (SAE 3100 Series)	5.97c.
Cold rolled alloy (SAE 2300)	8.45c.

Quantity extras apply to all items
*Price applies only in metropolitan Detroit.

. . . NON-FERROUS . . .

. . . Prime Western sales spurt to 6874 tons . . . Demand for lead continues unabated . . . Easier tone prevails in the copper market; independent interest is very small . . . Tin buyers await quota announcement.

NEW YORK, June 13—The spelter market stole the limelight of the non-ferrous market in the past week as prime Western sales unexpectedly soared to 6874 tons, the highest since mid-March. The week's volume of lead purchases showed no important change from recent levels, but sentiment in the copper market appeared to be veering to the soft side, despite the generally higher level of sales in the past few weeks. The European picture was comparatively quiet all week, but there appeared to be developing a new tenseness, which might explain to some degree the weakness shown by the foreign copper price during the last half of the week. This morning's export business was done at around 9.97c. per lb., c.i.f., usual base ports, as against a high of 10.17 c. 11 days ago. Domestic producers' sales are still being done on the basis of 10c. per lb., New York, but this level has been shaded in the open market. The concessions offered by the open market have not as yet been sufficient to attract much attention and practically all the past week's business, made up largely of affiliated fabricater buying, was done in the major market.

NON-FERROUS PRICES

Cents per lb. for early delivery

	June 7	June 8	June 9	June 10	June 12	June 13
Copper, Electrolytic[1]	10.00	10.00	10.00	10.00	10.00	10.00
Copper, Lake	10.00	10.00	10.00	10.00	10.00	10.00
Tin, Straits, New York	48.75	48.65	48.50	....	48.25	48.25
Zinc, East St. Louis[2]	4.50	4.50	4.50	4.50	4.50	4.50
Lead, St. Louis[3]	4.60	4.60	4.60	4.60	4.60	4.60

[1] Delivered Conn. Valley. Deduct ¼c. for New York delivery. [2] Add 0.39c. for New York delivery. [3] Add 0.15c. for New York delivery.

Warehouse Prices

Cents per lb., Delivered

	New York	Cleveland
Tin, Straits pig	49.25c.	51.25c.
Copper, Lake	11.25c.	11.125c.
Copper, electro	11.125c.	11.125c.
Copper, Castings	10.75c.	10.875c.
*Copper sheets, hot-rolled	18.12c.	18.12c.
*High brass sheets	16.48c.	16.48c.
*Seamless brass tubes	19.23c.	19.23c.
*Seamless copper tubes	18.62c.	18.62c.
*Brass rods	11.85c.	11.85c.
Zinc slabs	6.15c.	6.90c.
Zinc sheets, No. 9 casks	10.50c.	12.10c.
Lead, American pig	5.75c.	5.60c.
Lead, bar	6.35c.	8.25c.
Lead, sheets, cut	8.00c.	8.00c.
Antimony, Asiatic	15.00c.	17.00c.
Alum, virgin, 99 per cent plus	22.50c.	22.50c.
Alum., No. 1 remelt., 98 to 99 per cent	19.50c.	19.50c.
Solder, ½ and ½	29.125c.	29.25c.
Babbitt metal, commercial grade	21.00c.	21.25c.

*These prices, which are also for delivery from Chicago warehouses, are quoted with the following percentages allowed off for extras: on copper sheets, 33 1/3; on brass sheets and rods, 40, and on brass and copper tubes, 25.

Old Metals

Cents per lb., New York

Buying prices are paid by dealers for miscellaneous lots from smaller accumulators. Selling prices are those charged to consumers after the metal has been prepared for their uses.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible	7.875c.	9.50c.
Copper, hvy. and wire	6.875c.	7.25c.
Copper, light and bottoms	6.00c.	6.25c.
Brass, heavy	4.125c.	4.625c.
Brass, light	3.25c.	4.00c.
Hvy. machine composition	6.00c.	7.50c.
No. 1 yel. brass turnings	4.00c.	4.50c.
No. 1 red brass or compos. turnings	5.87c.	6.375c.
Lead, heavy	3.625c.	4.50c.
Cast aluminum	6.50c.	7.75c.
Sheet aluminum	12.25c.	13.75c.
Zinc	2.125c.	3.375c.

Miscellaneous Non-Ferrous Prices

ALUMINUM, delivered; virgin, 99 per cent plus, 20c.-21c. a lb.; No. 12 remelt No. 2 standard, 19c.-19.50c. a lb. NICKEL, electrolytic, 35c.-36c. a lb. base refinery, lots of 2 tons or more. ANTIMONY, prompt, New York; Asiatic, 14c. a lb., f.o.b.; American, 12c. a lb. QUICKSILVER, $85-$87 per flask of 76 lb. BRASS INGOTS, commercial 85-5-5-5, 10.25c. a lb.

Zinc

With the market price stymied by the weak London market on one hand and manufacturing costs on the other, domestic quotations remain unchanged at 4.89c. per lb., New York, in spite of an unexpected increase in bookings of prime Western metal. The week's total of 6874 tons compares with 4778 tons in the preceding market period. Shipments in the week were 4071 tons against 4072 in the previous week. Almost half of the period's business called for June delivery, while 2000 tons specified July shipment. The balance was scattered through to September. This morning's London equivalent was 2.92c. per lb., as compared with 2.93c. on Tuesday a week ago.

Lead

Both buying and consuming of lead continue at an excellent pace and shipments of 40,000 tons for May seem assured. The past week's sales were about 6500 tons, evenly divided between June and July, with practically every large consumer represented. An outstanding feature of the current market is the disposition of consumers to accept delivery of metal on contract in accordance with dates specified at time of purchase. One seller reports releases of close to 80 per cent of the lead carried on his books, while another reports that in many instances original shipping dates have been advanced. Domestic quotations are unchanged at 4.75c. per lb., New York. This morning's London price of 2.99c. per lb. on spot is practically the same as a week ago.

Tin

Outside of a few 5 and 10-ton purchases, the tin market was practically deserted all week. With announcement of third quarter quotas due this week, buyers both here and abroad were content to mark time. While opinion as to what action the council will take is mixed, domestic buyers favor a slight increase which would tend to alleviate the current shortage in prompt straits. Prices on this grade moved down steadily during the week, touching 48.25c. per lb., New York, today, a loss of ½c. from the price of a week ago. Cash standards in London declined from £225 10s. on Tuesday a week ago, to £224 10s. this morning.

YOU

can help defend the machine!

The second in a series of six presentations by Mr. J. H. Van Deventer in defense of the machine, was published in last week's Iron Age (June 8, pages 11 to 18). It is entitled "He's Back in 1899 and Doesn't Know It."

You can help the defense by distributing reprints where you think they will do the most good.

Reprints of the 8-page article printed in 3 colors on India tint stock may be obtained at the following prices:

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THE IRON AGE

A Chilton Publication

239 WEST 39TH ST. NEW YORK

PLANT EXPANSION AND EQUIPMENT BUYING

NORTH ATLANTIC

American Cyanamid & Chemical Corp., 30 Rockefeller Plaza, New York, industrial chemicals, has approved plans for new works at Kalamazoo, Mich. Cost about $300,000 with equipment. It will replace a smaller plant in same city, with large increase in capacity. L. R. Verdon is company manager at Kalamazoo.

Coca-Cola Bottling Co., Inc., Tuckahoe, N. Y., plans new two-story mechanical-bottling plant, about 30 x 100 ft. Cost close to $70,000 with equipment.

Purchasing and Contracting Officer, Office of Quartermaster, Second Corps Area, Governors Island, New York, asks bids until June 19 for pipe fittings, irrigation valves, gate valve boxes, valves, plugs, crosses, reducers, etc. (Circular 52-29).

Western Electric Co., 195 Broadway, New York, telephone instruments and equipment, wire, etc., has asked bids on general contract for new three-story factory branch, storage and distributing plant, 112 x 210 ft., on Forest Road, N. E., Atlanta, Ga., with two-story service, repair and garage building adjoining. Cost over $500,000 with equipment. W. R. Kattelle, first noted address, is company engineer.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until June 20 for two air-operated forging hammers (Schedule 6512) for Brooklyn Navy Yard; carbon-molybdenum steel tubing (Schedule 6529) for Brooklyn and Philadelphia yards.

American Record Corp., 1776 Broadway, New York, manufacturer of talking machine records, etc., has let general contract to W. J. Barney Corp., 101 Park Avenue, for extensions and improvements in plant on Barnum Avenue, Bridgeport, Conn. Cost over $100,000 with equipment. Fellheimer & Wagner, 155 East Forty-second Street, New York, are architects.

Endo Products, Inc., 395 Fourth Avenue, New York, chemical products, has acquired five-story building, about 150 x 225 ft., on 101st Street, Richmond Hill, Queens, L. I., totaling about 60,000 sq. ft. of floor space, for main plant.

Signal Corps Procurement District, Army Base, Fifty-eighth Street and First Avenue, Brooklyn, asks bids until June 20 for 110,000 ft. of wire, 31,000 ft. of cable and 12 reels (Circular 289); until June 23, plugs, loops, vibrators, mountings, spare parts, etc. (Circular 263; until June 26, cable in nine lots, from 10,000 to 45,000 ft., and 40,000 to 60,000 ft., each lot, and 11 reels (Circular 266).

Best Foods, Inc., 88 Lexington Avenue, New York, canned and packed foods, plans two-story and basement addition to branch plant, Bayonne, N. J. Cost over $50,000 with equipment. Lockwood Greene Engineers, Inc., 30 Rockefeller Plaza, New York, is architect and engineer.

Asbestos-Cement Pipes, Inc., Woodridge (Bergen County), N. J., recently organized, has let contract to F. L. Smith & Co., 225 Broadway, New York, for design and erection of new plant on about 30-acre tract, near Saddle River Road, Woodridge, lately acquired for production of pipe and other cement products. Cost over $200,000 with equipment.

Commanding Officer, Ordnance Department, Picatinny Arsenal, near Dover, N. J., asks bids until June 20 for 30,000 fuse bodies for igniting, formed of small die castings (Circular 878), two analytical balances (Circular 901), two powder head assemblies for 350 dehydrating presses, made of steel forgings or steel castings (Circular 903); until June 23, 950 target practice projectiles, made of machined castings, with copper rotating bands, rope grommets and base plugs (Circular 856), continuous rectification equipment for ether and alcohol (Circular 861), air-conditioning system (Circular 857); until June 26, automatic milling machine, horizontal, indexing (Circular 864).

Commanding Officer, Ordnance Department, Frankford Arsenal, Philadelphia, asks bids until June 20 for one surface grinder, with 8 x 24-in. table, alternate bids on two, three or four similar machines; nine surface grinders with 6 x 18-in. tables; five universal grinders, alternate bids on two and five, and three and five similar machines; and four tool and cutter grinders (Circular 1274); until June 21, four high-speed milling attachments (Circular 1291), six motor-driven radial drills, two drilling and tapping machines, and nine drill presses (Circular 1282); until June 22, boring mill, generator, duplicating machine and spur gear shaper (Circular 1280).

BUFFALO DISTRICT

Campbell-Vincent Co., Waterloo, N. Y., manufacturer of automobile bodies and parts, has acquired former local car house of Geneva, Waterloo, Seneca Falls & Auburn Traction Co. and will remodel for new plant. Cost close to $50,000.

Great Lakes Carbon Corp., 30 Rockefeller Plaza, New York, recently organized to manufacture graphite and carbon electrodes, and allied products, has let general contract to Walter S. Johnson Building Co., Inc., 2532 Hyde Park Boulevard, Niagara Falls, N. Y., for new plant on 15-acre tract at Fifty-sixth Street and Pine Avenue, near city limits of Niagara Falls. Cost over $65,000 with equipment. B. E. Broadwell is company engineer. Company is affiliated with Great Lakes Coal & Coke Co., Chicago.

United States Engineer Office, Federal Building, Buffalo, asks bids until June 22 for one portable drill float and spare parts (Circular 156).

WASHINGTON DIST.

Quartermaster, Marine Corps, Washington, asks bids until June 19 for two gasoline engine-driven centrifugal pumping units and 100 ft. of water suction hose, 2-in. (Schedule 777).

Bureau of Yards and Docks, Navy Department, Washington, asks bids (no closing date stated) for two 40-ton and one 5-ton bridge cranes, and six 5-ton wall cranes for Norfolk Navy Yard, Portsmouth, Va. (Specification 9170). Bureau is securing appropriation for new buildings at proving grounds, Dahlgren, Va., in naval appropriation bill for coming fiscal year, including locomotive and crane shed, cost $20,000 exclusive of equipment; magazine building and accessories, $35,000; garage and woodworking shop, $45,000, and other structures.

Essex Corp., Charlottesville, Va., organized by Manning M. Exton, Charlottesville, and associates, has leased one-story building in Rose Hill district, and will remodel for manufacture of fountain pens, automatic pencils and allied products.

General Purchasing Officer, Panama Canal, Washington, asks bids until June 19 for one hand-operated combination punch and shear, two motor-driven centrifugal blowers, two motor-driven utility drills, 10,000 ft. of rigid steel conduit, 150,000 ft. of rubber-insulated copper wire, 4000 lb. of hard-drawn copper wire, 1000 conduit boxes and other equipment (Schedule 3483); until June 20, diesel engine-powered crawler shovel unit, with 1½ cu. yd. dipper, dipper boom and stick, 45-ft. crane boom and 10-ft. insert for crane boom (Schedule 3484).

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until June 20 for two rotary surface grinders (Schedule 6517) for Alexandria, Va., yard; milling machine (Schedule 6519), grinder (Schedule 6520) for Sewall's Point yard; three boring, drilling and milling machines (Schedule 6518) for Washington yard, all motor driven; steel flanges (Schedule 6546) for Boston, Charleston and Puget Sound yards; steel propeller shafts (Schedule 6505) for Norfolk, Mare Island, Eastern and Western yards; 1500 crucibles without covers (Schedule 6510) for Portsmouth, N. H., yard; until June 23, electric bake oven, inside dimensions 60 x 60 x 120 in. (Schedule 6498) for Eastern or Western yard.

SOUTH ATLANTIC

Atlanta Coca-Cola Bottling Co., 260 Edgewood Avenue, Atlanta, Ga., has let general contract to Griffin Construction Co., 452 Spring Street, N. W., for new two-story and basement mechanical-bottling plant, 200 x 225 ft., at Spring, Williams and Sixth Streets. Motor service, repair and garage department will be installed in basement. Cost close to $250,000 with equipment. George H. Bond, Candler Building, is architect. New plant will replace works at first noted address.

Lyles Ford Tri-County Power Authority, Union, S. C., plans three hydroelectric generating plants on Broad, Tiger and Encoree Rivers, respectively, comprising power dams, reservoirs, spillways and auxiliary structures, with stations for capacity of 72,000-hp. Project will include construction of about 250 miles of transmission lines in Union, Newberry, Fairfield, Kershaw, Chester and neighboring counties, with power substations and switching stations. Cost over $2,000,000.

NEW ENGLAND

Electric Boat Co., Groton, Conn., has let general contract to Smith Construction Co., Inc., 101 Water Street, Derby, Conn., for one-story shop addition. Cost close to $50,000 with equipment.

Bureau of Yards and Docks, Navy Department, Washington, asks bids until June 28 for one or more 20-ton fixed hammerhead cranes for Boston Navy Yard (Specifications 9098). Bureau is securing fund of $2,545,000 in new naval appropriation bill for extensions and improvements in drydock at Boston yard and bids will be asked soon. General contract has been let to Pittsburgh-Des Moines Steel Co., Neville Island, Pittsburgh, for one-story addition to ship-fitting shop at Portsmouth, N. H., Navy Yard, 219 x 435 ft., at $346,000 exclusive of equipment.

V. La Rosa & Sons, Inc., 473 Kent Avenue, Brooklyn, N. Y., food products, has let general contract to Fusco & Amatruda, Inc., 59 Amity Road, New Haven, Conn., for new two-story plant, 85 x 400 ft., at Danielson, Conn. Cost about $130,000 with equipment. Leo F. Caproni, 1221 Chapel Street, New Haven, is architect.

Commanding Officer, Ordnance Department, Springfield Armory, Springfield, Mass., asks bids until June 19 for four small chambering machines (Circular 462); until June 20, one 6 x 18 in. surface grinder (Circular 458); until June 21, 200 high-speed steel hook-type rifling cutters (Circular 463).

SOUTH CENTRAL

Goodyear Tire & Rubber Co., Akron, Ohio, has awarded general contract to A. K. Adams Co., 542 Plum Street, N. W., Atlanta, Ga. for a four-story addition to branch mill at Gadsden, Ala., 100 x 100 ft. Cost over $250,000 with equipment.

Auto Vehicle Parts Co., 1024 Saratoga Street, Newport, Ky., automobile parts and

equipment, has asked bids on general contract for one-story addition, 60 x 90 ft. Cost close to $40,000 with equipment. John L. McDermott, 65 Blue Grass Street, Fort Thomas, Ky., is architect.

Director of Purchases, Tennessee Valley Authority, Knoxville, Tenn., asks bids until June 21 for one flat bottom steel water storage tank for Watts Bar construction camp and village; until June 22, one 312-kva. gasoline engine-generator unit and accessories for Chickamauga hydroelectric generating plant; until June 26, one-story addition to fertilizer plant of Department of Chemical Engineering at Wilson Dam, for storage and distribution.

Police Jury of East Baton Rouge Parish, Baton Rouge, La., asks bids until June 27 for two municipal incinerators, with furnaces, conveyors and auxiliary equipment. Cost about $55,000. Overstreet & Towne, Baton Rouge, are consulting engineers.

SOUTHWEST

Chevrolet Motor Division, General Motors Corp., 3044 West Grand Boulevard, Detroit, has let general contract to Patti Construction Co., 1114 Broadway, Kansas City, Mo., for one-story addition to branch assembling plant at Kansas City, totaling about 40,000 sq. ft. of floor space. Cost about $90,000 with equipment. O. W. Pughe is chief engineer for company at Kansas City.

Phillips Petroleum Co., Bartlesville, Okla., plans expansion and improvements in crude oil refinery at Kansas City, Kan., including new units, steel tank storage facilities and other equipment. Cost about $750,000 with equipment.

American Fruit Growers, Inc., Highland, Ark., has approved plans for new packing plant on local site, consisting of several one-story buildings with capacity of about 40 cars per day; also two one-story units for oil emulsion plant for production of wet spray, and lime and sulphur works for manufacture of dry spray respectively. Cost over $100,000 with equipment.

Socony-Vacuum Oil Co., Inc., 4140 Lindell Boulevard, St. Louis, has asked bids on general contract for new bulk oil storage and distributing plant near Zepp and Potomac Streets, consisting of several buildings, with steel tank storage units and other facilities. Cost over $75,000 with equipment.

Commanding Officer, Ordnance Department, San Antonio Arsenal, San Antonio, Tex., asks bids until June 21 for one high-speed power hacksaw, one milling attachment (Circular 38), until June 22, nine metal tool chests, socket wrenches and box wrenches, 1250-watt gasoline engine-driven generator unit, portable type (Circular 36); until June 26, four screw-cutting engine lathes (Circular 39).

WESTERN PA. DIST.

Continental Rubber Works, 1902 Liberty Street, Erie, Pa., general rubber goods, molded rubber products, etc., has let general contract to Henry Shenk Co., 1115 Sassafras Street, for three-story addition, 62 x 75 ft. Cost over $75,000 with equipment. H. M. Nelson, 921 West Seventh Street, is engineer.

United States Engineer Office, Huntington, W. Va., asks bids until July 6 for pumping stations for protection project for Ceredo-Kenova, W. Va.

Westinghouse Electric & Mfg. Co., East Pittsburgh, has leased two-story and basement building, 100 x 200 ft., to be erected at 1041-51 First Avenue South, Seattle, by Oregon-Washington Railroad Co., Seattle, for factory branch, storage and distributing plant. Cost over $125,000 with equipment. Erection contract has been let to Bailey Construction Co., Insurance Building, Seattle.

OHIO AND INDIANA

Ohio Steel Foundry Co., Lima, Ohio, has asked bids on general contract for one-story addition, 185 x 225 ft. Cost over $150,000 with equipment. Albert Kahn, Inc., New Center Building, Detroit, is architect and engineer.

Forest City Brewery, Inc., 6900 Union Avenue, S. E., Cleveland, has engaged R. Franklin Outcault, 13124 Shaker Square, architect, to prepare plans for two three-story additions for expansion in mechanical-bottling, storage and distributing departments respectively. Cost about $90,000, of which equipment purchases will represent close to $50,000. Bids will be asked on general contract in July.

Village Council, North Baltimore, Ohio, plans municipal power plant for street lighting and other power service, 38 x 112 ft., installation to include two 450-hp. and one 375-hp. diesel engine-generator units and accessories. Cost close to $195,000. C. J. Simon, Van Wert, Ohio, is consulting engineer.

Univis Lens Co., 46 Cannon Street, Dayton, Ohio, manufacturer of bifocal and other lenses, will ask bids soon on general contract for four-story and basement addition, 46 x 100 ft. Cost about $75,000 with machinery, including grinding equipment, etc. Geyer & Neuffer, Ludlow Arcade Building, are architects.

Contracting Officer, Materiel Division, Air Corps, Wright Field, Dayton, Ohio, asks bids until June 19 for spring joint dividers, radius, telescope and thickness gages, radius gage holders, screw pitch gages, steel rules, etc. (Circular 1153, gear tooth vernier calipers and vernier height gages (Circular 1150), aircraft storage batteries (Circular 1160).

Allison Engineering Co., Speedway City, Indianapolis, manufacturer of aircraft motors and parts, division of General Motors Corp., has engaged Austin Co., Cleveland, engineer and contractor, to prepare plans for one-story additions, to occupy part of 12-acre tract adjoining present plant. New units will approximate 200,000 sq. ft. of floor space for expansion in parts production and assembling. Cost close to $5,000,000 with machinery, instead of smaller amount previousy noted. J. Lloyd Allen, Architects' and Builders' Building, Indianapolis, is supervising architect.

MICHIGAN DISTRICT

Chevrolet Motor Division, General Motors Corp., 3044 West Grand Boulevard, Detroit, has let general contract to Barge-Thompson Co., 136 Ellis Street, N. E., Atlanta, Ga., for new one-story assembling plant at Atlanta, 120 x 722 ft. Cost over $500,000 with equipment. Albert Kahn, Inc., New Center Building, Detroit, is architect and engineer.

Glenco Refining Co., Mount Pleasant, Mich., recently organized by Glen Caldwell, Mount Pleasant, and associates, has approved plans for immediate construction of new oil refinery at Bloomingdale, Mich., where site has been secured. It will include power house, steel tank storage department and other facilities. Cost about $100,000 with machinery.

Schust Baking Co., Saginaw, Mich., division of Loose-Wiles Biscuit Co., Kansas City, Mo., has let general contract to Clausen Co., 15529 Woodrow Wilson Avenue, Detroit, for three-story addition. Cost close to $150,000 with mixing machinery, traveling ovens and other equipment.

MIDDLE WEST

National Aluminate Corp., 6221 West Sixty-sixth Place, Chicago, manufacturer of continuous blow-down equipment, chemical specialties for water-treatment, etc., has asked bids on general contract for one-story addition, 105 x 125 ft. Cost close to $75,000 with equipment. Ambrose C. Cramer, 820 North Michigan Avenue, is architect.

Swift & Co., Oil Mill Division, Union Stock Yards, Chicago, have let general contract to James Stewart Corp., 343 South Dearborn Street, for new soy bean processing plant on site recently acquired at Des Moines, Iowa, comprising several one-story units, with storage facilities for 1,500,000 bu. at one time. Cost close to $300,000 with equipment.

Bureau of Reclamation, Denver, asks bids until June 26 for high-pressure gate, 61 ft. by 7½ ft., with frames, hoist, semi-automatic gate hanger and auxiliary equipment for gate chamber of controlling works of Shoshone Canyon conduit, Heart Mountain division, Shoshone project, Wyo. (Specifications 1241-D).

Nebraska Refining Co., Hastings, Neb., M. H. Robineau, president and general manager, plans new oil refinery of several units, with department for gasoline production, steel tank storage division, power house, pumping station and other structures. Cost close to $350,000 with equipment.

American Manganese Steel Co., 389 East Fourteenth Street, Chicago Heights, Ill., has let general contract to Campbell-Lowrie-Lautermilch Co., 400 West Madison Street, Chicago, for two one-story additions, one for expansion in foundry, and other for general service, with boiler house. Cost close to $60,000 with equipment. Benjamin F. Olson, 19 South LaSalle Street, Chicago, is architect.

Construction Service, Veterans' Administration, Washington, asks bids until July 5 for boiler unit and boiler plant equipment for power house at institution at Hot Springs, S. D.

PACIFIC COAST

Bureau of Yards and Docks, Navy Department, Washington, has secured fund of $1,750,000 through new naval appropriation bill for a graving dry dock at Mare Island Navy Yard, and installation of equipment; also appropriations of $100,000 for new utility and transportation buildings, and $120,000 for laboratory building with equipment, same yard; and fund of $3,000,000 for new graving dry dock and equipment at Puget Sound yard, Bremerton, Wash. Bids are scheduled to be asked soon.

Val-Vita Food Products, Inc., 1003 Santa Fe Avenue, Los Angeles, has leased one-story building, 200 x 525 ft., for plant, to be erected at Fullerton, Cal., by Union Pacific Railway Co., Los Angeles, for which general contract will be let soon. One-story office building will be erected on adjoining site. Cost over $100,000 with equipment. Douglas McLellan, 816 West Fifth Street, Los Angeles, is architect.

Bureau of Reclamation, Denver, asks bids until June 22 for gantry cranes and diffusion racks and gates for control of migratory fish racks at Leavenworth Station, Columbia Basin project, Wash. (Specifications 1239-D); until June 23, metal work for fish elevators for control of migratory fish at same station (Specifications 1240-D); until June 21, two 10-ft. x 8-ft. top seal radial gates with operating mechanisms, float-well equipment, and miscellaneous metal work and embedded parts for Fortuna automatic spillway, gravity main canal, Gila project, Ariz. (Specifications 1238-D); until June 27, 25-ton, single-motor, overhead traveling crane for valve house at outlet works at Wickiup dam, Deschutes project, Ore. (Specifications 1242-D).

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until June 23 for three motor-driven ram-type turret lathes (Schedule 6513) for Puget Sound yard; power-actuated portable tools, including 25 complete under-water drivers; also for copper washers, centering plugs, punch units, wrenches, vises, metal guard caps and other equipment (Schedule 6530) for Mare Island yard.

FOREIGN

Automatic Telephone & Electric Co., Ltd., Norfolk House, Norfolk Street, London, England, telephone, telegraph and signaling equipment, has approved plans for four-story addition to plant at Strowger, Liverpool, England, superstructure to begin at once. Cost over $200,000 with equipment.

Airport Department, Liverpool, England, plans new steel hangars, repair and reconditioning shops, and other mechanical structures at municipal airport at Speke. Cost about $250,000 with equipment.

THIS WEEK'S MACHINE . . . TOOL ACTIVITIES . . .

. . . Trend difficult to discern in a spotty market . . . Falling off in inquiries reported, but buying is fairly well sustained . . . Rock Island Arsenal actively buying.

Inquiry Volume Falls; Orders Well Sustained

CINCINNATI — The local machinery market turned spotty during the past week, although manufacturers' optimism continues to be sustained. A sharp decrease in inquiry, primarily for lathes, sounded a minor note in market comments of the current week. The total volume of lathe orders also was down somewhat during the past week, but the greater bulk of orders was from domestic sources, which fact tended to offset pessimistic feelings arising from the decrease in general inquiry. Further reported domestic demand for planers and boring mills combined with the continued good demand for milling machines and grinders placed most of the indications in the current market on the optimistic side of the ledger, although the average bookings for the entire market are down a few points from the preceding week. Brakes, shapers are still very active and drilling machinery tends to better interest.

Factory operations are still sustained between 60 and 70 per cent of market capacity with a healthy backlog sufficient to sustain these operations for quite some time to come. In fact, a number of local factories are operating almost to capacity to avoid penalties on time shipments.

Rock Island Arsenal Gets Many Machinery Bids

CHICAGO — Business placed in June has not yet been sufficient to establish much basis for a comparison with last month. Considerable work was held over from May, however, and many sellers are confident much of this will break this month. The International Harvester Co. is expected to buy some machines during June for its Milwaukee and Chicago tractor works. The Rock Island arsenal took bids last week on eight turret lathes, a hole grinder, tool grinder, center lapping machine, jig borer, several automatic screw machines and a thread grinder. On June 20 the arsenal will receive bids on an internal grinder, six turret lathes, two automatic screw machines, one measuring machine, two two-spindle horizontal lapping and polishing machines for piston rods, and eleven hydraulic lapping and honing machines. Many sales differed widely among various sellers, one reporting the best month in several years, and another a loss of 40 per cent from April in dollar volume and over 50 per cent in unit volume. The former company sells nationally and attributes most of its success last month to districts other than the Midwest. It does, however, report wide diversification, both geographically and from an industry standpoint.

Machinery for 1940 Models Now in Delivery Stage

DETROIT—A holding back in plans for producing the Ford tractor, pending more field tests, has eased the pressure for delivery of machine tools for this job. It has been learned that while some equipment is still to be added, most of it has been purchased or provided out of the plant's inventory of unused equipment. Delivery and installation constitute the principal activity in the machine tool business in Detroit, although altered production schedules in effect since the settlement of the Briggs strike have caused some adjustment in plans for 1940 production. Return to work of the Briggs employees again brings to life the Chrysler die work which was stagnant while 1200 die workers were away from their jobs at the Briggs Vernor Highway plant.

Volume Lower, But Diversification Better in the East

NEW YORK—Machine tool sales in this section were probably on a lower level as to dollar volume on the average last week, but dealers in several instances reported a better diversification of sources of orders. A number of buyers were heard from that only occasionally enter the market. Most of these were small concerns. The large industrial firms did not figure in this business and for the moment, the aircraft parts industry was quiet, but this is only a temporary condition as there is plenty of business in sight from this latter source. The volume of general inquiries has fallen off, and the future is quite clouded, except for business coming from direct or indirect Government channels.

England and Japan Active in Buying Tools

CLEVELAND — To date, June has proved spotty for producers as well as dealers. Some companies report improvement in orders, however.

One producer is understood to have booked around 17 machines for England. Activity on the part of Japan has also been very good. A number of sales have been made in the Buffalo territory recently. The used machinery market has been moderately active during the past week here.

Steel for Household Goods Off in 1938

CONSUMERS' purchases of nearly 3,863,000 refrigerators, kitchen ranges and electric washing machines represented a market for approximately 260,000 gross tons of steel during 1938.

The sharp reduction from the record total of 6,691,000 units sold in 1937, which represented a market for 461,000 tons of steel, coincided almost exactly with the rate of decline in total tonnage of steel produced between 1937 and 1938, according to the American Iron and Steel Institute.

Approximately 121,000 gross tons of steel were used in manufacturing 1,425,000 gas and electric refrigerators in 1938, according to estimates based on an average consumption of 190 pounds of steel per refrigerator. In 1937, when refrigerator sales established a record, about 222,000 gross tons of steel were used in making the 2,618,000 refrigerators sold that year.

Steel for the 1,300,000 gas and electric ranges which were sold during 1938 totaled approximately 110,000 gross tons, also on the basis of 190 pounds per unit. Sales of ranges in 1937 totaled 2,273,000 units, and accounted for almost 193,000 gross tons of steel.

Approximately 29,000 gross tons of steel were used in the 1,138,000 washing machines which were sold during 1938, based on an average of 57 lb. of steel for each unit. Final figures for 1937 indicated sales of 1,800,000 washing machines, in which 46,000 gross tons of steel were used.

Taxes Topped Fuel Costs For Railroads in 1938

WASHINGTON—Railroad taxes in 1938 were nearly $100,000,000 greater than the expenditures of the railroads for fuel in that year, according to the Association of American Railroads. The same source said class I railroads in the first quarter of 1939 had a net deficit of $43,591,000 after fixed charges, compared with a net deficit of $105,737,000 in the same period last year.